

ALLIANCE

in association with

Prein&Newhof

PLANNING STUDY FINAL REPORT

14 OCTOBER 2021

TERMINAL PLANNING STUDY

CHERRY CAPITAL AIRPORT, TRAVERSE CITY, MICHIGAN

Alliance Commission No.: 2020030

This Planning Study Report has been prepared for the **Cherry Capital Airport** by the following team members

DESIGN TEAM

ARCHITECT

Alliance

400 Clifton Avenue

Minneapolis, MN 55403

612.874.4100

www.alliance.us

CIVIL ENGINEER

Prien&Newhof

990 Garfield Woods Dr, Suite A

Traverse City, MI 49686

231.946.2394

www.preinnewhof.com/

TABLE OF CONTENTS

ISSUE HISTORY

Rev	Date	Description
1A	10.14.2021	Issued for Publish

TABLE OF CONTENTS

Abbreviations, Acronyms, and Initialisms	3
01 PROJECT OVERVIEW	5
Project Introduction	6
Project Location	6
02 EXISTING FACILITIES ANALYSIS	8
Site Configuration	9
Interior Conditions — Airside / Post-Security / Concourse	10
Interior Conditions — Landside / Pre-Security / Terminal	11
03 FACILITY DEMAND / CAPACITY ANALYSIS	13
Overall Project Demand	14
04 PREFERRED ALTERNATIVE	16
Initial Alternatives	17
Alternatives Evaluation Criteria	17
Site Layout	19
Terminal Expansion Apron Phasing	20
Interior Development	21
Airside / Post-Security / Concourse	22
Landside / Pre-Security / Terminal	25
Further Studies in Future Phases of Design	28
05 ROUGH ORDER OF MAGNITUDE (ROM) COST ESTIMATE	29
ROM Costing Summary	30
06 ANTICIPATED SPACE ELIGIBILITY FOR AIP AND PFC	32
Introduction	33
Anticipated Eligible Areas	33

APPENDIX

A: 2020 Passenger Survey Results	37
B: Commercial Service Activity Forecasts (2020-2035)	39
C: Facility Requirements Planning Assumptions	40
D: Detailed Space Program	43
E: Site Configuration — Initial Alternatives	48
F: Site Configuration — Curbside	57
G: Site Configuration — Part 77 Analysis	58
H: Site Configuration and Walking Distances	59
I: Baggage Makeup Area / Tug Traffic Clearances	60
J: Initial Alternatives — Interior Development	61
K: Additional Restroom Concept Prototypes	63
L: Prototypical Gate Holdroom Configuration	64
M: Concessionaire Survey	65
N: Parking Survey and Future Needs	75
O: Photo Inventory of Existing Conditions	86

ABBREVIATIONS, ACRONYMS, AND INITIALISMS

AC	Advisory Circular (FAA)
ACRP	Airport Cooperative Research Program
ADG	Aircraft Design Group
ADRM	Airport Development Reference Manual (IATA)
AIP	Airport Improvement Program (FAA)
ATCT	Air Traffic Control Tower
ATO	Airline Ticket Office
BHS	Baggage Handling System
BPH	Bags Per Hour
BPP	Bags Per Passenger
BSO	Baggage Service Offices
CBIS	Checked Baggage Inspection System
CFR	Code of Federal Regulations
CRPG	Checkpoint Requirements and Planning Guide (TSA)
CT	Computed Tomography
DDFS	Design Day Flight Schedule
EDS	Explosive Detection System
FAA	Federal Aviation Administration
FIS	Federal Inspection Station
F&B	Food and Beverage
GSE	Ground Service Equipment
HVAC	Heating, Ventilation, and Air Conditioning
IATA	International Air Transport Association
LF	Linear Foot or Linear Feet
LoS	Level of Service (IATA)
NPIAS	National Plan of Integrated Airport Systems (FAA)
PBB	Passenger Boarding Bridge
PFC	Passenger Facility Charge (FAA)
PGDS	Planning Guidelines and Design Standards (TSA)
PHP	Peak Hour Passenger
PMAD	Peak Month Average Day
PSR	Private Screening Room (TSA)
RON	Remain Overnight
RPE	Revenue Per Enplaned Passenger
SARA	Service Animal Relief Area
SSCP	Security Screening Checkpoint (TSA)
sf	Square Foot or Square Feet
TDC	Travel Document Checker (TSA)
TRB	Transportation Research Board
TSA	Transportation Security Administration
TVC	Cherry Capital Airport
VSR	Vehicle Service Road



01 PROJECT OVERVIEW

01 PROJECT OVERVIEW

INTRODUCTION

PROJECT INTRODUCTION

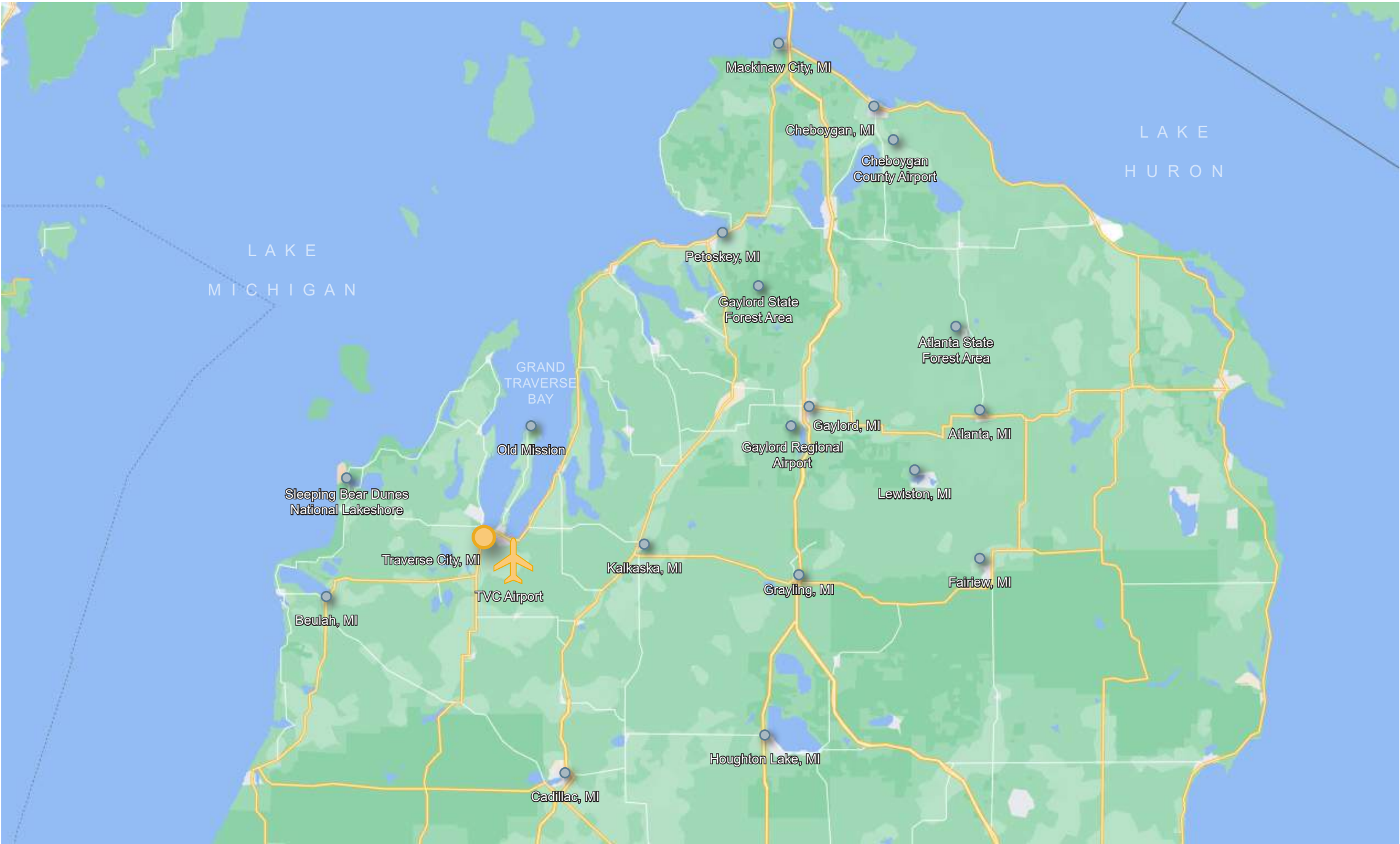
Given sustained growth in passenger traffic at TVC, Alliance was retained by Prein&Newhof, the prime consultant, to develop conceptual planning alternatives for expansions and renovations of the terminal and the concourse. Alliance assessed high-level conceptual aircraft parking and gate expansion options based on the results from the Terminal Facilities Demand/Capacity analysis. This study also included an inventory and tabulation of the existing facilities' terminal spaces, including both public and non-public areas, in order to compare demand associated with future facility requirements using a provided 15-Year Commercial Service Activity Forecast. Additional studies included alternative layouts for administration offices, pre-security concessions, inbound baggage claim expansion, and relocation of rental car facilities.

PROJECT LOCATION

Cherry Capital Airport (TVC) is located 2.3 miles southeast of the central business district of Traverse City, in Grand Traverse County, Michigan. The Traverse City area is home to spectacular beaches and recreational opportunities including miles of pristine sandy beaches, some of the nation's top breweries, wineries, and distilleries, along with world-class dining and entertainment. Traverse City is home to the National Cherry Festival which, along with several other cultural events and activities that call the city home, draws thousands of visitors to the area every year.

01 PROJECT OVERVIEW

INTRODUCTION



PROJECT CONTEXT



02 EXISTING FACILITIES ANALYSIS

02 EXISTING FACILITIES ANALYSIS

CURRENT CONDITIONS

SITE CONFIGURATION

AIRCRAFT PARKING / AIRFIELD / JET BRIDGES

TVC currently provides eight aircraft parking positions serving a mix of both regional and narrowbody aircraft operating from five passenger boarding bridges (PBB) with multiple remain overnight (RON) parking locations. Four of the current PBBs serve two aircraft positions each. The existing apron is bound by apron edge taxilanes to the East, West, and North and provides access to parallel Taxiway “G” to the North via Taxiways G3 and G4.

Due to the location of the existing Runway 10/28, parallel Taxiway “G”, and the location of the existing terminal building, the airside concourse has limited expansion potential to the north. While the previous Master Plan had proposed an additional “pod” north of the existing based on predominantly small/medium regional turboprop aircraft, a shift to large regional and narrowbody aircraft eliminates any parking positions of these larger types on the north side of the future pod due to FAA Part 77 surface limitations (see Appendix for Part 77 analysis).

OVERALL BUILDING LAYOUT

The linear terminal consists of ticketing, baggage claim, baggage handling, passenger screening, and passenger amenities. In front of the terminal are drop-off/pick-up lanes and a curbside canopy. The terminal is connected to the north “pod” concourse via a “river” of circulation that also encompasses the Transportation Security Administration (TSA) passenger security screening checkpoint (SSCP) and office functions, airside concessions and restrooms, and the passenger arrival exit lane. The pod concourse to the north is surrounded by aircraft parking positions, boarding bridges, and apron areas for ground service as previously described. Airport administration space is located on the mezzanine level above the ticket lobby.

CURBSIDE / CANOPY

The existing curbside canopy does not cover vehicles in the drop-off/pick-up lanes nor in the drive aisles along the front of the terminal. Therefore, passengers and their drivers are exposed to any inclement weather until they step onto the curb. Additionally, snow, ice, or rain falling from the edge of the canopy may fall onto people and/or vehicles while they are in the curbside roadway.

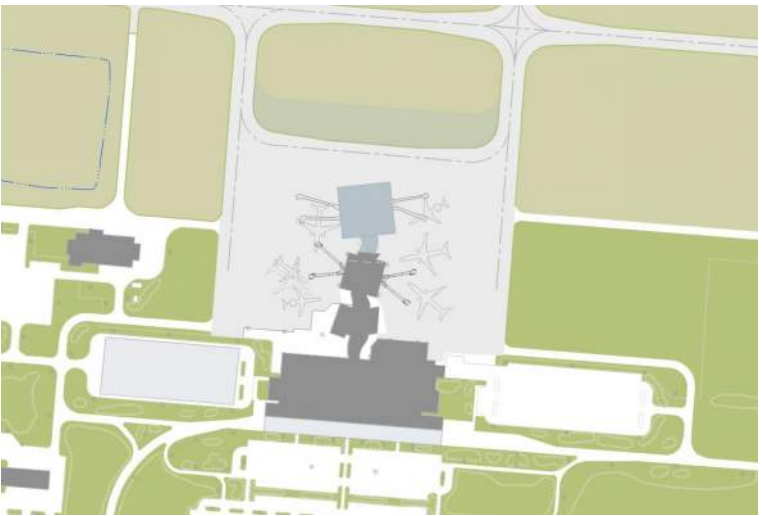
OUTDOOR PATIO WITH SERVICE ANIMAL RELIEF AREA (SARA)

An outdoor patio is located post security along the existing “river” circulation route, accessed via a door near the concessions space adjacent to the TSA SSCP area. This patio contains a small outdoor service animal relief area (SARA). From anecdotal observation, this patio appears to be slightly underutilized by passengers, which may be influenced by its distance from the gate holdrooms.



EXISTING SITE CONFIGURATION

Not to Scale



MASTER PLAN CONFIGURATION

Not to Scale



EXISTING CURBSIDE CONDITIONS



EXISTING OUTDOOR PATIO WITH SARA

02 EXISTING FACILITIES ANALYSIS

CURRENT CONDITIONS

INTERIOR CONDITIONS — AIRSIDE / POST-SECURITY / CONCOURSE

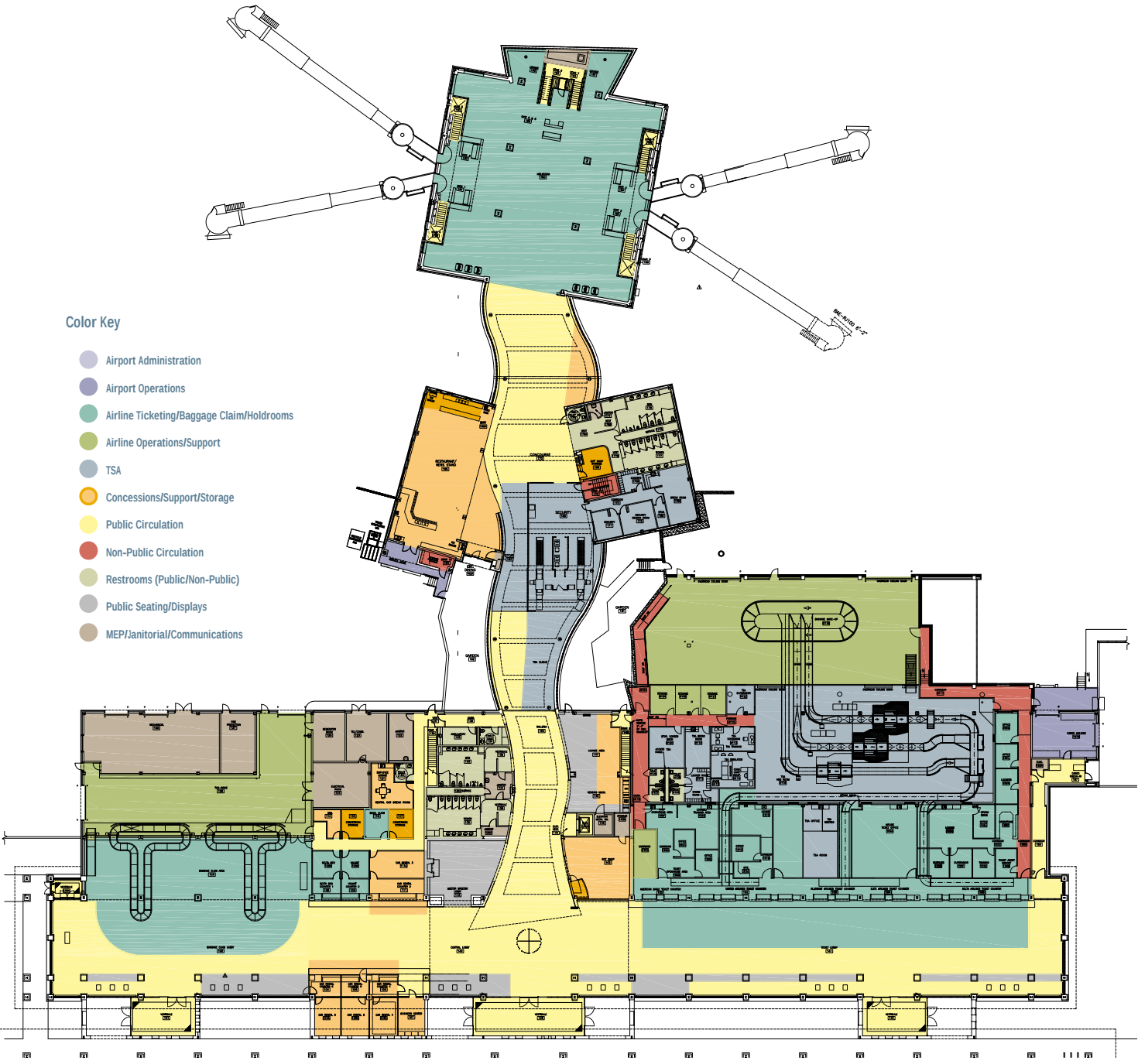
GATE HOLDROOMS

In its current configuration, the gate holdroom area for all gates is consolidated within the existing north pod. Circulation to and from each gate occurs down the center of the holdroom. Seating space is limited to space not allocated for passenger circulation. At peak passenger volumes, passengers overflow the gate holdroom, and some wait for their flight in the “river” connector near the recomposure area at the end of the checkpoint where additional seats have been added.

The airport has expressed a desire to maintain aspects of the architectural character of the existing north pod within the design for the new concourse expansion.

CONCESSIONS

In the current facility, the Cherry Country Café is the sole post-security concessions, a small food and beverage tenant with primarily grab-and-go offerings. The café is located immediately adjacent to the end of the checkpoint, a short walk from the gate holdroom area.



EXISTING FIRST LEVEL FLOOR PLAN
Not to Scale

02 EXISTING FACILITIES ANALYSIS

CURRENT CONDITIONS

INTERIOR CONDITIONS — LANDSIDE / PRE-SECURITY / TERMINAL

The Cherry Capital Airport facility has a strong aesthetic identity that has been embraced by the community, and a number of the spaces within the terminal continue to function well and are in need primarily of updates to lighting and general finishes.

SECURITY SCREENING CHECKPOINT (SSCP)

The existing SSCP consists of two standard X-ray baggage screening machines shared by one Advanced Imaging Technology (AIT) whole body scanner and one walk-through metal detector (WTMD). Passenger queuing and recomposure occurs in the “river” circulation space before and after the screening equipment. TSA offices are located immediately east of the screening area and consist of a private screening room (PSR), office, breakroom, lockers, and storage. Due to the location of the current space, constraints limit the ability to accommodate the latest screening equipment technology and TSA space requirements.

CENTRAL COMMONS / RESTROOMS / CONCESSIONS

The Central Commons, restrooms, and concessions spaces are the first areas of the terminal that travelers and visitors experience upon entering the airport from the curbside entrances. The Central Commons contains the primary passenger amenities and services including the Fireplace Room, Gift Shop, Restrooms, Vending Lounge area, and it is the connection to the Ticketing Hall, Baggage Claim and Security Checkpoint. These areas generally function well and primarily are in need of updates to flooring, wall finishes, and lighting as well as new plumbing fixtures and partitions in the restrooms. The addition of a Mother’s Lounge in the Central Commons is also recommended.

TICKETING / BAGGAGE MAKEUP / STORAGE / LOADING DOCK

The Ticketing Area currently accommodates 28 counter positions serving four airlines (American, Delta, United, and Allegiant) with sufficient queuing space directly adjacent. Baggage conveyors connect to an in-line Explosives Detection System (EDS) baggage screening area operating two X-ray units with space to add a third unit. The area behind the ticket counters is utilized for Airline Ticketing Offices (ATOs) as well as TSA space and Airport Storage. The Ticketing Hall lacks expansion space for additional counter and queuing space and airlines require additional ATO space. The existing baggage makeup area is extremely tight with limited turning area for carts resulting in damage to both the building and the makeup carousel. The existing carousel lacks sufficient laydown space for the the current needs.

Back of house functions such as airport storage and loading dock require additional space. The airport is currently utilizing ATO space for storage; this space is insufficient and is needed for airline use. The loading dock includes a single dock position with some cargo holding space. There is not sufficient area to accommodate a trash compactor.



EXISTING GATEHOLD AREA



EXISTING CORRIDOR CONNECTOR



EXISTING GATEHOLD AREA



EXISTING CORRIDOR CONNECTOR

02 EXISTING FACILITIES ANALYSIS

CURRENT CONDITIONS

RENTAL CARS / BAGGAGE SERVICE OFFICES (BSO)

Rental car desks are located directly off the Central Commons, prior to reaching baggage claim. Queuing at the rental car desks tends to block the main circulation path and access to the baggage claim during peak times. Baggage Service Offices (BSOs) are located adjacent to the east carousel. The airport has indicated that the Airlines have limited need for BSO space.

BAGGAGE CLAIM AND LAYDOWN

The existing baggage claim area at TVC includes two flat-plate claim carousels. The tug drive and laydown area for baggage carts is immediately to the north of the claim hall, with a pair of access doors for each carousel. An oversize bag belt with a dedicated baggage door is provided at the west end of the claim hall. A single vestibule links the claim hall to the curbside; a separate, smaller vestibule on the west end of the terminal leads toward the rental car parking lot. This vestibule is quite small and requires a ninety-degree turn in circulation, which can pose maneuvering challenges for passengers with roller bags or using mobility devices. The claim hall is an extension of the primary east-west volume of the terminal, with the Central Commons area linking it to the ticketing area on the east end of the terminal. The aesthetic form, structural module, and architectural details of the baggage claim area reflect those of the other areas of the terminal and the facility as a whole.

PHOTO INVENTORY OF EXISTING CONDITIONS

Additional photos of the existing conditions at TVC at the time of the commencement of this planning study in October 2019 are included in the Appendix.



EXISTING CORRIDOR CONNECTOR



EXISTING EXIT LANE AND SSCP QUEUE



EXISTING BAGGAGE CLAIM



EXISTING TICKETING HALL



03 FACILITY DEMAND / CAPACITY ANALYSIS

03 DEMAND/CAPACITY AND FACILITY REQUIREMENTS

OVERALL PROJECT DEMAND

OVERALL PROJECT DEMAND

The overall terminal facility requirements were developed through the application of a variety of industry accepted planning standards and guidelines including: ACRP Report 25, Airport Passenger Terminal Planning and Design; FAA AC 150/5360-13A, Airport Terminal Planning; FAA AC 150/5300-13A, Airport Planning; the TSA Checkpoint Requirements and Planning Guide (CRPG); the TSA Planning Guidelines and Design Standards (PGDS) for Checked Baggage Inspection Systems Version 7.0; ACRP Report 226, Planning and Design of Airport Terminal Restrooms and Ancillary Spaces” and the International Air Transport Association (IATA) Airport Development Reference Manual (ADRM), 11th Edition. Additionally, planning factors from comparable airports around the U.S., web-based passenger intercept surveys conducted for TVC, communication with airport and local TSA staff, and knowledge of industry trends were also utilized.

IATA’s Level of Service (LoS) standards are typically utilized by airport planners to qualitatively or quantitatively provide a LoS standard at various processing functions within the terminal building. An “Optimum” LoS was utilized when validating the functional passenger spaces and is often referred to as LoS “C” and defined by IATA as providing “Good LoS; condition of stable flow; acceptable brief delays; good level of comfort.” Current utilization ratios were determined using the existing terminal lease computer-aided design (CAD) plans provided by the Airport and the 2019 Design Day Flight Schedule (DDFS), which serves to establish a Baseline condition of demand compared to current facility capacities.

Airport terminal facilities are typically programmed using demand associated with future projections of annual and peak hour passengers and operations. Although annual activity is a good indicator of overall airport size, peak hour volumes more accurately reflect demand for specific passenger processing functions within the terminal facilities. These peak hours are typically calculated from the peak month’s average day (PMAD) and are commonly referred to as Design Hour passengers. A total of four DDFS (2023, 2025, 2030, and 2035) developed from demand scenarios described in the “Commercial Service Activity Forecasts (2020-2035)” narrative were utilized for future calculations. Demand year 2035 represents the demand requirements to which all conceptual alternatives were developed to meet.

This analysis used two types of peak passenger levels based on Preferential Use and Common Use. Preferential Use passenger levels refer to the peak activity for each carrier that occurs over a “rolling” 60-minute period based on that airline’s flight schedule. As a result, these Preferential Use peaks may happen at different times of the day and therefore do not typically coincide in the same clock hour. The assumption is that this peak demand is appropriate to use when determining the facility requirements for individual airlines that are operating under a Preferential Use agreement with the airport. These areas may include individual airline’s ticket counters, gates/holdrooms, and the baggage claim facilities. Common use peak passenger levels refer to the cumulative peak passenger volume in a given “rolling” hour for all airlines at the airport. These common use peak demand levels are typically used for calculating non-airline specific functions such as passenger security screening, baggage screening, and public areas including general seating and meeter/greeter lobbies. For TVC individual airline peak hours were utilized for ticketing requirements whereas the airport’s common use peak hour was utilized for expulsive detection system (EDS) baggage screening, baggage makeup, SSCP, and baggage claim facilities.

TVC - Cherry Capital Airport Trigger Points & Demand Analysis	2019			Forecast			
	Existing	Recommended	Capacity Threshold	2023	2025	2030	2035
General							
Annual Enplanements	290,372			345,122	388,432	530,253	646,068
Aircraft Gates/PBB	4	11		12	13	14	14
Aircraft Positions	7	11		12	13	14	14
Public Space							
Circulation (public seating, ticketing, concourse, bag claim, general circ)	22,822 s.f.	32,480 s.f.	✗	✗	✗	✗	48,190 s.f. ✗
Ticket Lobby Queue	3,556 s.f.	3,600 s.f.	✗	✗	✗	✗	5,340 s.f. ✗
Passenger Security Screening & TSA Offices	5,906 s.f.	8,030 s.f.	✗	✗	✗	✗	10,220 s.f. ✗
# of Screening Lanes	2	2	!	!	!	✗	3 ✗
Passenger Holdrooms	7,911 s.f.	18,340 s.f.	✗	✗	✗	✗	29,920 s.f. ✗
Baggage Claim (retrieval/device/meeter&greeter)	5,419 s.f.	2,820 s.f.	✓	!	✗	✗	10,600 s.f. ✗
# of Devices	2	1	✓	!	!	✗	3 ✗
Linear Frontage	200 l.f.	94 l.f.	✓	!	✗	✗	388 l.f. ✗
Restrooms (pre/post security)	2,781 s.f.	3,920 s.f.	✗	✗	✗	✗	7,640 s.f. ✗
Other (Misc Tenant, information)	1,003 s.f.	1,130 s.f.	✗	✗	✗	✗	1,280 s.f. ✗
Airline Space							
Ticketing (counter, ATO)	6,870 s.f.	5,710 s.f.	✓	!	✗	✗	8,440 s.f. ✗
# of Agent Positions (includes Bag Drop)	24	17	✓	✓	!	✗	26 ✗
# of Kiosks	8	8	!	✗	✗	✗	12 ✗
Outbound Baggage Screening	5,192 s.f.	3,460 s.f.	✓	✓	✓	!	5,190 s.f. !
# of EDS Machines	2	2	!	!	!	✗	3 ✗
Outbound Baggage Makeup	3,893 s.f.	6,220 s.f.	✗	✗	✗	✗	9,400 s.f. ✗
Airside Ops/Storage	658 s.f.	810 s.f.	✗	✗	✗	✗	1,380 s.f. ✗
Inbound Bag Claim Laydown	2,333 s.f.	1,400 s.f.	✓	✗	✗	✗	8,400 s.f. ✗
Inbound/Outbound Baggage Circulation	2,665 s.f.	1,900 s.f.	✓	✓	✗	✗	4,450 s.f. ✗
Baggage Service Offices (BSO)	686 s.f.	300 s.f.	✓	✓	✓	!	600 s.f. !
Other Offices/Support Space	0 s.f.	120 s.f.	!	!	!	!	210 s.f. !
Concessions							
Landside & Storage (includes Rental Cars)	3,693 s.f.	3,370 s.f.	!	!	!	✗	4,610 s.f. ✗
Airside & Storage	3,099 s.f.	2,380 s.f.	✓	!	✗	✗	5,290 s.f. ✗
Non-Public Space							
Non-Airline Tenant Space	136 s.f.	130 s.f.	!	!	!	!	130 s.f. !
Airport Administration	5,446 s.f.	5,440 s.f.	!	!	!	!	5,440 s.f. !
Restrooms/Circulation	3,383 s.f.	3,390 s.f.	!	✗	✗	✗	5,490 s.f. ✗
Airport Operations (Maintenance,Janitorial,Storage,Shops)	713 s.f.	1,050 s.f.	✗	✗	✗	✗	1,720 s.f. ✗
Building Systems & Support (MEP,Communications/IT,Loading Docks,Structure)	20,743 s.f.	16,500 s.f.	✓	!	✗	✗	27,190 s.f. ✗
TOTAL GROSS (sq ft)	108,908 s.f.	122,500 s.f.	✗	✗	✗	✗	201,130 s.f. ✗
		-13,592 s.f.		-24,222 s.f.	-46,792 s.f.	-90,352 s.f.	-92,222 s.f.

TABLE 3-1: OVERALL PROGRAM

Legend

✓

Programmed area is less than existing

!

Programmed area is at or over 85% of capacity

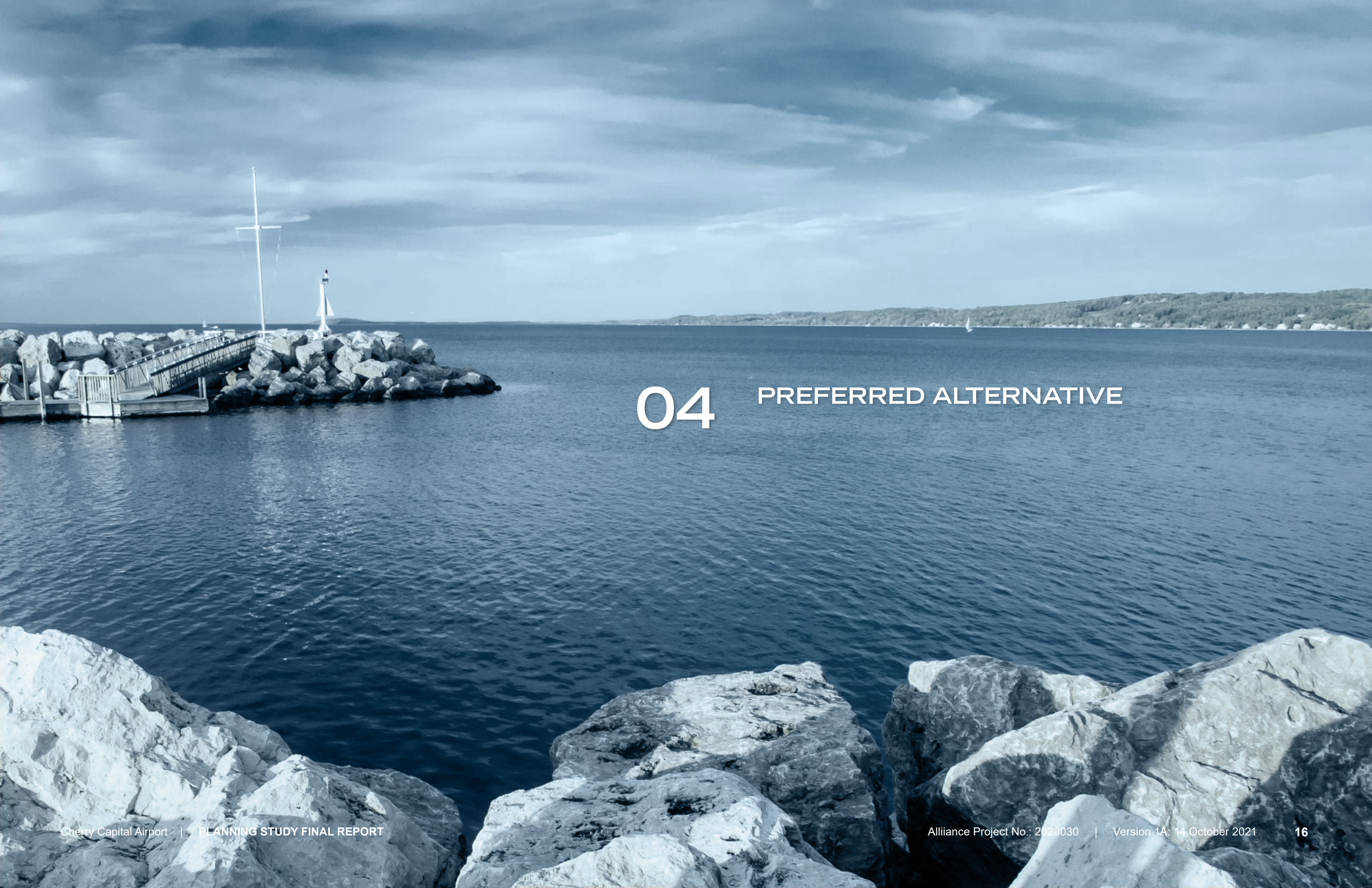
✗

Programmed area is greater than existing

03 DEMAND/CAPACITY AND FACILITY REQUIREMENTS

OVERALL PROJECT DEMAND

Table 3-1 summarizes the space program by year. Refer to the Appendix for the Facility Requirements Planning Assumptions narrative. The programmatic approach to sizing facility areas as previously described is commonly used as the first step during the planning and preliminary design of any expansion project. As a project proceeds through the design process functions such as ticketing, baggage areas, holdrooms, circulation areas, concessions, and other space-based requirements will often change as a result of the physical configuration of the design and cost considerations. The demand requirements contained in Table 3-1 is considered a minimum generic facilities requirement program that is recommended to support the design aircraft and their associated peak hour passenger activity levels. Results from the 2035 DDFS indicated a need for 14 contact gates with associated passenger boarding bridges (PBB). This included a total of four medium regional and ten narrowbody size gates and associated gate holdroom space. While the expansion alternatives were developed to provide maximum apron parking flexibility by providing most gates with the ability to accommodate 737-900/A321 type aircraft, the gate holdrooms were programmed based on the gate requirements. The airport includes an existing total of nearly 109,000 gross square feet. The 2035 required total programmed area of approximately 201,300 gross square feet exceeds existing facility capacity by approximately 92,400 square feet. Most of this area is allocated to areas such as circulation, outbound baggage makeup, SSCP, passenger gate holdrooms, and baggage claim and laydown areas. Existing demand exceeds current facility capacity; however, individual spaces should be reviewed for determining the time at which their capacity shortfalls will occur. Industry best practice is to start planning for additional space which serves the public and baggage processing functions when demand reaches approximately 85% of existing capacity within the various areas of the terminal and related concourse areas. Crossing this capacity threshold triggers the need to begin planning, design, and construction process to replace facilities in time to meet the growing passenger demand levels. Table 3-1 indicates the point at which these trigger points will be met. Refer to the Appendix for full program by passenger activity levels.



04 PREFERRED ALTERNATIVE

04 PREFERRED ALTERNATIVE

ALTERNATIVES DEVELOPMENT

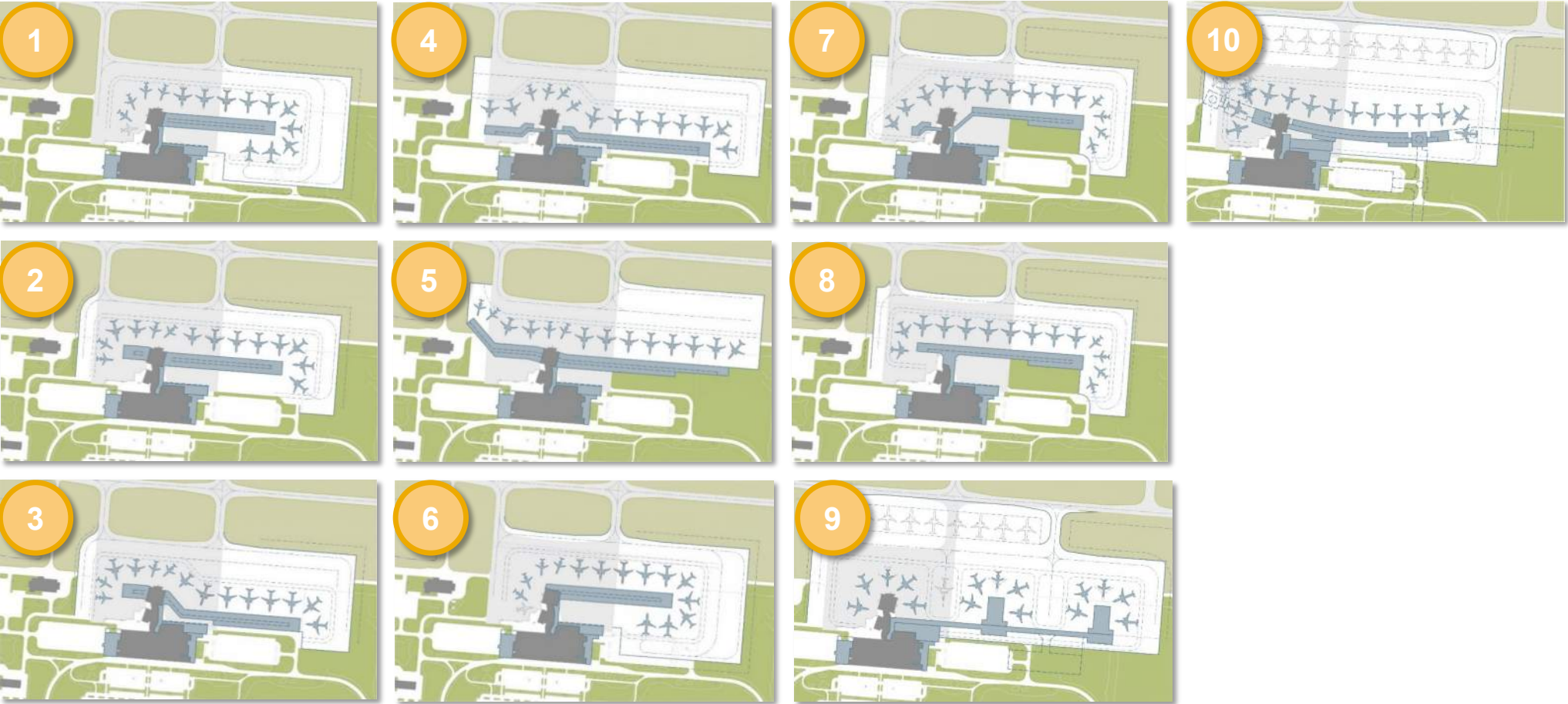
INITIAL ALTERNATIVES

Several site expansion alternatives were studied based on existing site constraints that include Runway 10/28 to the north, the Aircraft Rescue and Firefighting (ARFF) station to the west. The development of each site alternative utilized industry-accepted planning parameters such as those identified in FAA AC 150/5300-13A and ACRP Report 25 relative to taxiway and taxilane dimensional criteria, aircraft parking depth and wingtip spacing, concourse width and associated gate planning. A total of ten alternatives were developed. These alternatives were developed to evaluate the extents of the site in regards to providing the most effective layout in terms of initial and future long-term gate capacity and apron aircraft parking and maneuvering efficiency. Refer to the Appendix for enlarged versions of these initial alternatives.

ALTERNATIVES EVALUATION CRITERIA

To evaluate the strengths and weaknesses of each alternative relative to each other, an initial set of criteria was developed in conversation with airport leadership as follows:

- 1. Avoid public and employee parking reduction in the short term, to provide for ultimate terminal development
 - Alternatives 1 & 6 eliminate Employee Parking
- 2. Common elements within each alternative
 - Alternative 4 has elements in common with Alternatives 3 & 7
- 3. Alternatives which expand on similar alternatives
 - Alternate 5 expands Alternate 2



INITIAL SITE ALTERNATIVES

Not to Scale



04 PREFERRED ALTERNATIVE

EVALUATION MATRIX

• *Alternate 8 expands alternate 7*

Based on these criteria, five alternatives were selected for further consideration -- Alternatives 4, 5, 8, 9, and 10. Next, to compare these shortlisted alternatives, the evaluation criteria was further refined and presented to airport board members for their use in evaluating each arrangement.

- 1. Apron/Gate use flexibility & minimizes pushback/jetblast conflicts**

Provides flexibility of use in aircraft gates and apron for potential fleet mix changes, airline operations, & aircraft de-icing opportunities. Improves taxiway/taxilane flows and minimizes pushback and potential jetblast conflicts.
- 2. Program efficiency & Passenger Level of Service**

Effective utilization of the terminal/concourse footprint, provides the needs identified by the Airport, and improves spatial LoS while minimizing walking distances.
- 3. Ability to “deactivate” portions during non-peak season**

Provides “Use Zones” that allow portions of the terminal to be deactivated during the non-peak season.
- 4. Construction phasing effectiveness with ability for future expansion**

Provides a feasible approach to construction phasing while maintaining existing operational capability (no loss of gates, services or utilities). Alternative provides an ultimate expansion path well beyond the Master Plan forecast horizon that is achievable with minimal impacts.
- 5. Site utilization**

The alternative demonstrates prudent utilization of the airport’s land for an efficient terminal and apron footprint.

The above criteria was used during a collaborative workshop with airport leadership to evaluate the shortlisted altneratives and arrive at the matrix of results shown at right.

Criteria Categories	TVC Site Study Alternatives - Evaluation Matrix				
	Alternative 4	Alternative 5	Alternative 8	Alternative 9	Alternative 10
	SCORE	SCORE	SCORE	SCORE	SCORE
1 Apron/Gate use flexibility & minimizes pushback/jetblast conflicts					
2 Program efficiency & Passenger Level of Service					
3 Ability to "deactivate" portions during non-peak season					
4 Construction phasing effectiveness with ability for future expansion					
5 Site utilization					
TOTAL ALTERNATIVE	0.0	-3.0	-5.0	5.0	1.0

Scoring Scale:
Highest Score = 1
Lowest Score = -1

Color Scoring Scale:

1 = Positive

0 = Neutral

-1 = Negative

04 PREFERRED ALTERNATIVE

SITE LAYOUT

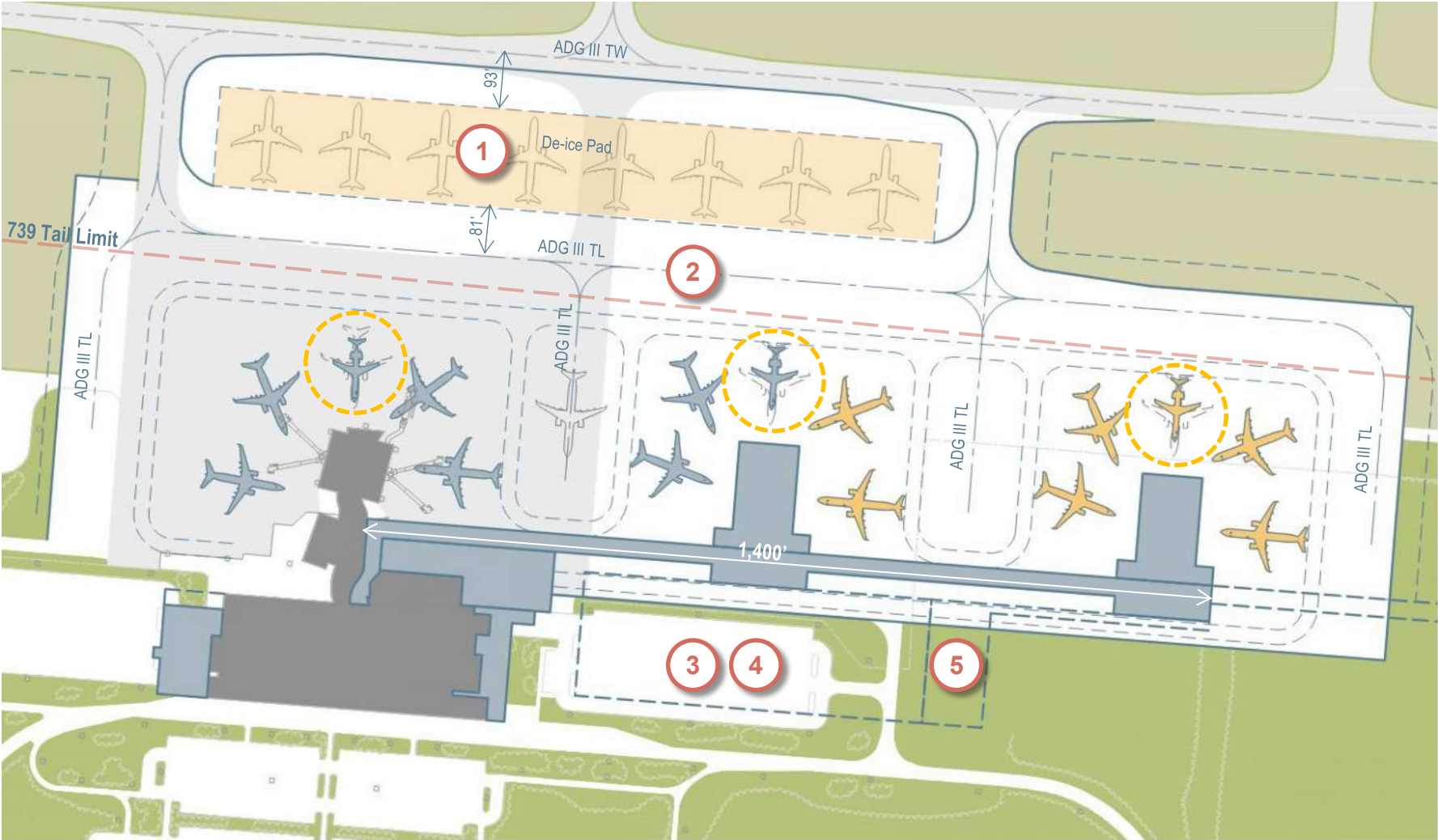
The following sections describe the preferred alternative which was selected from an array of initial layouts investigated for providing the necessary capacity increases to the existing terminal facility and its associated airside needs. This alternative depicts TVC’s 2035 facility demand as presented in the previous sections. Alternative 9 is described in greater detail below; refer to the Appendix for additional content regarding the initial alternatives studied.

SITE LAYOUT

Preferred Alternative 9 provides adequate airside parking capacity with design aircraft including the 737-900 (739) and the A321neo (321). While both aircraft have identical wingspans the 321’s length is longer while the 739 tail is higher. The designed aircraft safety area which includes a 20-foot wingtip separation would accommodate additional large narrowbody aircraft such as the 737 MAX series and the A321XLR.

Alternative 9 provides two additional “pods” to the east of the existing pod separated by single Aircraft Design Group (ADG) III Taxilanes and vehicle service roads (VSR) at the aircraft tails. Each pod accommodates five aircraft, one medium regional and four large narrowbody for a total of 15 bridged gates. While each aircraft parking position can accommodate large narrowbody aircraft (739/321), the gate holdrooms are programmed based on the gate requirements from the DDFS. The existing five bridged gates would remain with slightly reconfigured lead-in lines in order to provide the greatest parking flexibility as the new gates.

The land area between Taxiway “G” and the relocated apron taxilane could be constructed for future de-icing operations. Typically this is driven by need and environmental permitting. The area as shown in Alternative 9 remains a good “green” concept and can be implemented when desired or when demand dictates. In the interim the area can remain greenspace and when pavement is desired, FAA standards will be evaluated along with drainage infrastructure.



ALTERNATIVE 9
Not to Scale

- DIAGRAM KEY NOTES
- 1. De-icing pad
 - 2. ADG III Taxilane
 - 3. Maintains existing employee parking lot
 - 4. Possible future replacement terminal
 - 5. Possible future Federal Inspection Station (FIS)

AIRCRAFT GATES
3 CRJ-700 (CR7)
12 739/A321 NEO
15 Total

COLOR KEY

- New Pavement
- Existing Pavement
- Proposed Building
- Existing Building
- Existing relocated aircraft
- New aircraft

04 PREFERRED ALTERNATIVE

SITE LAYOUT

A new 30-foot wide corridor which connects all three pods extends approximately 1,400 feet to the east from the existing gates. This width could accommodate bi-directional moving walks or cart-assisted movement. For enhanced gate access and overall flexibility, the corridor and pods could be elevated by ramping the connector between the existing gates and second pod at a gentle slope of less than 1:20. This would provide shorter access routes to/from the terminal baggage makeup and laydown areas, along with overall airport/airline airside support spaces and GSE storage areas. Apron access to the gates would be from existing Taxiway G and facilitated using ADG III Taxilanes. A new VSR located at the tails of the aircraft, would run the entire perimeter of the pods. The double-loaded pods provide a width of approximately 100 feet allowing for increased holdroom depths. Additional expansion for a potential fourth pod would occur further east. The area between existing Taxiway G and the parallel apron taxilane could be paved for aircraft de-icing operations. Terminal expansion to the east, west, and north accommodates ticketing and security, baggage claim, and baggage makeup respectively.

TERMINAL EXPANSION APRON PHASING

The implementation of the proposed terminal apron expansion will need to be a multi-phased development extending over multiple grants and/or projects. The goal is to achieve greater apron parking capacity for Remain-Overnight (RON) parking positions to alleviate current demand and offset potential construction impacts. Each phasing plan's intent will be to minimize impacts to airport operations to the greatest extent possible. Proposed construction phases of TVC's terminal apron expansion project are described below.

PHASE 1

This apron construction phase would develop a terminal apron expansion to the west. This would allow for remote air carrier enplaning\deplaning and RON parking during peak times. This area will also provide necessary aircraft parking while other phases are under construction.

PHASE 2

The second phase of the terminal apron expansion would be to the north. Similar to Phase 1, this section would expand options for remote enplaning\deplaning and RON parking. The area will eventually facilitate a push back zone in the area currently used as apron edge taxilane. The current parking plan utilizes all space for parked mainline aircraft up to the South edge of the taxilane object free area. During this phase and subsequent phases, the recommendations of the storm water plan for the future terminal development would need to begin to be implemented.

PHASE 3

The last phase of the terminal phase expansion would be to the east to coincide with the preferred alternative for the terminal building expansion. Given the potential size of apron required, this phase could be further segmented based upon construction phasing, storm water management, and available funding. Apron pavements in this phase would serve to provide for taxiing, pushback, and new gate access.

04 PREFERRED ALTERNATIVE

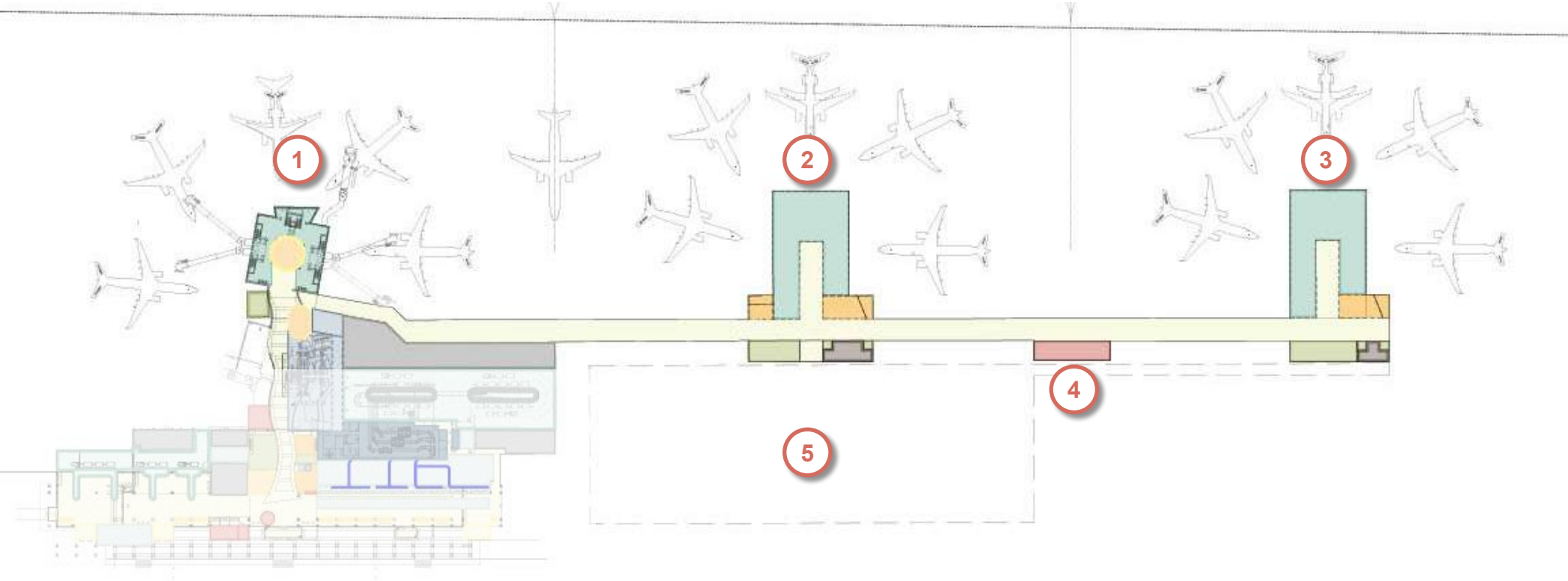
CONCEPTUAL INTERIOR DEVELOPMENT

INTERIOR DEVELOPMENT

In conjunction with the site layout alternatives, the interiors of the new and expanded concourse and terminal areas were studied. Based on input received, one concept emerged as a preferred alternative – Alternative 9. The various alternatives each focus on distinct approaches to the concourse layout; the development of the terminal areas in the various alternatives is largely identical, reflecting the preferred layouts for each of the renovated or expanded landside areas. At the request of the airport, an alternative based on Alternative 9, including a screening checkpoint rotated ninety degrees clockwise from that shown at right, is shown in the Appendix.

As this Planning Study focuses on programming – spatial adjacencies and right-sizing – these options reflect preliminary proposals for planning purposes. As the project moves into design phases, further studies will be required to reconcile programmatic needs with architectural form, finishes, and integration of systems (structural, MEP, security, etc.). A thorough evaluation of existing conditions, beyond that included as part of this programming study, will be paramount to the design process.

Each airline's corporate real estate team was contacted for input. All expressed interest in the expansion, provided no comment on capacity or square footage calculations provided, and are interested in detailed final design aspects.



INTERIOR DEVELOPMENT: ALTERNATIVE 9

Not to Scale

DIAGRAM KEY NOTES

- 1. Gates 1-5: 4 narrowbody + 1 medium regional
- 2. Gates 6-10: 4 narrowbody + 1 medium regional
- 3. Gates 11-15: 4 narrowbody + 1 medium regional
- 4. Amenity Space: Possible Flyer's Club, Children's Play Area, Gallery Lounge, Music Performance, Interfaith/Meditation Rooms, and/or Sensory Rooms
- 5. Possible future replacement terminal

Color Key Legend	
Gate Holdroom	Airport Operations (Support, Loading Dock, etc.)
Circulation	Vertical Circulation
Seating Lounge	TSA Lease Space
Concessions (F & B, Retail)	Security Screening Checkpoint / Queuing
Passenger Amenity Space	Baggage Handling
Restrooms, SARA, Companion Care, Mother's Rm	Airlines / Car Rentals
Airport Administration	Building Support (Mech, Elec, IT, etc.)
	Existing

04 PREFERRED ALTERNATIVE

CONCEPTUAL INTERIOR DEVELOPMENT

AIRSIDE / POST-SECURITY / CONCOURSE

GATE HOLDROOMS AND CIRCULATION

Alternative 9 reserves square footage for the gate holdroom areas and circulation as determined necessary to accommodate the planned aircraft fleet mix in the programming tables. As described above, these square footages are based on an “Optimum” LoS.

The “connecting” corridors are designed with a width of 30 feet in order to accommodate potential future bi-directional moving walkways, or Automated People Movers (APM) devices. The remaining area would provide a comfortable width for walking and the movement of electric cart type vehicles.

APM devices are typically provided when walking distances are in excess of 1,500 feet or for satellite type concourse layouts where the concourse is physically separated from the terminal. While a fourth “pod” would exceed this suggested threshold and trigger APM discussions, a new centralized terminal located between the two middle pods may reduce overall walking distances.

CONCESSIONS

Areas within the existing Concourse Pod and the expansion has been allocated based on the anticipated enplanements and flight schedule. The location and type of concessions will need to be studied further in the future design phases of the project given the seasonal variations in the number of travelers through the airport.

A concessions survey conducted during the course of this pre-design study identified the following points and recommendations:

- Strongest preference was for restaurant/table service, followed by fast food, and then café (without table service).
- According to the consultant, the likelihood of a sit-down restaurant being viable is low and not recommended.
- One option to explore was to offer and test table service in the existing café.
- Consultant also suggested testing a beverage bar (local beers and wines) in the gatehold area during busy times.
- Of the 43% which indicated they didn’t buy anything, the majority were afternoon/evening travelers. The consultant suggests tapping into these travelers by offering more snack and lite fare options.
- Of those surveyed, requests included more charging outlets and lounge chairs, covered walkways, and healthier food options.

Food concessionaires were also contacted. They indicated an immediate need for 50% more square footage for kitchen and seating space, with corresponding growth according to the forecast.

04 PREFERRED ALTERNATIVE

CONCEPTUAL INTERIOR DEVELOPMENT

NURSING MOTHERS' ROOM

The Nursing Mothers' Room or Lactation Suite is an area of quiet respite for nursing mothers. This room or set of rooms is comfortably outfitted with amenities to accommodate breastfeeding or lactation. TVC leadership has expressed their desire for this space to be very hospitable, almost resort-like, to create the most pleasant experience for passengers. Comfortable lounge seating and tables, quiet acoustics, and possible noise cancellation devices or ambient music create a quiet retreat away from the hustle and bustle of the rest of the airport. Baby changing amenities and a sink for washing equipment and hands are provided in a separate room from or away from the lounge seating area.

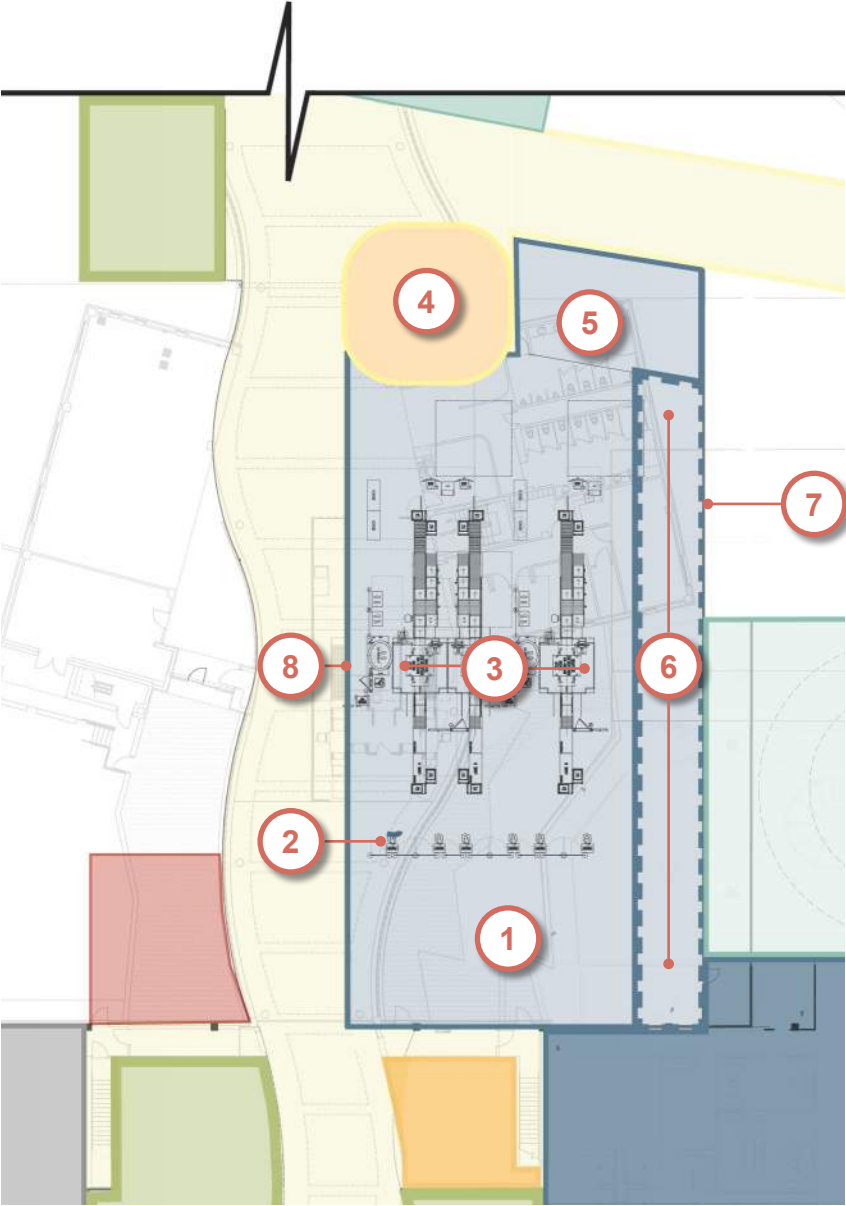
OTHER POSSIBLE PASSENGER AMENITIES

A wide variety of amenities can be provided within the new facility to add to passengers' comfort and enhance their overall experience at Cherry Capital Airport. While the exact type, size, and design of these amenities will be developed in coordination with the airport stakeholders during project design phases, some additional possible ideas to reserve space within the footprint might include: lounges with soft seating and other provisions; children's play areas; art galleries or places for music performance; interfaith prayer/meditation rooms; and/or sensory rooms.

SECURITY SCREENING CHECKPOINT (SSCP) / RECOMPOSURE / TSA

The checkpoint layout shown at right includes space for three screening lanes and reserves space to the east for an additional future fourth lane. The new exterior wall to be built flanking the checkpoint to the east may contain glazed openings such as windows or clerestories or be of curtainwall construction allowing ample daylight into and views out of the checkpoint, improving passenger comfort. To the west of the screening lanes, separated possibly by a glazed partition that allows light transfer, an exit corridor allows arriving passengers to exit the secure side of the airport and head into the main terminal. To the north of the screening lanes, at the exit from the screening area, a recomposue area links the checkpoint to the main circulation juncture near the existing holdroom pod and the connector to the new gates. Space is also reserved for TSA offices and a Private Screening Room (PSR).

The SSCP screening area is designed to meet current TSA planning guidelines as well as including area for future screening equipment such as CT X-rays and various Automated Screening Lane (ASL) technologies. The increased length offers greater flexibility for both passenger divesting and reconciliation of their baggage. Increased queuing area meets the TSA guidelines for four lanes. During periods of "social distancing" the queue area could be configured to allow every other queue lane to be open, or plexiglass barriers could be placed on top of the stanchions to allow full use of the queue. Overflow areas could be designated in the general circulation space leading up to the main queue entrance.



INTERIOR DEVELOPMENT: SECURITY SCREENING CHECKPOINT (SSCP)

Not to Scale



DIAGRAM KEY NOTES

1. Queueing
2. Travel document checker (TDC) podiums
3. Screening lanes
4. Recomposure
5. TSA Office & Private Screening Room (PSR)
6. Space reserved for future SSCP expansion
7. Glazed exterior wall, possibly including clerestories
8. Glazed partition between SSCP and exit corridor

04 PREFERRED ALTERNATIVE

CONCEPTUAL INTERIOR DEVELOPMENT

RESTROOMS

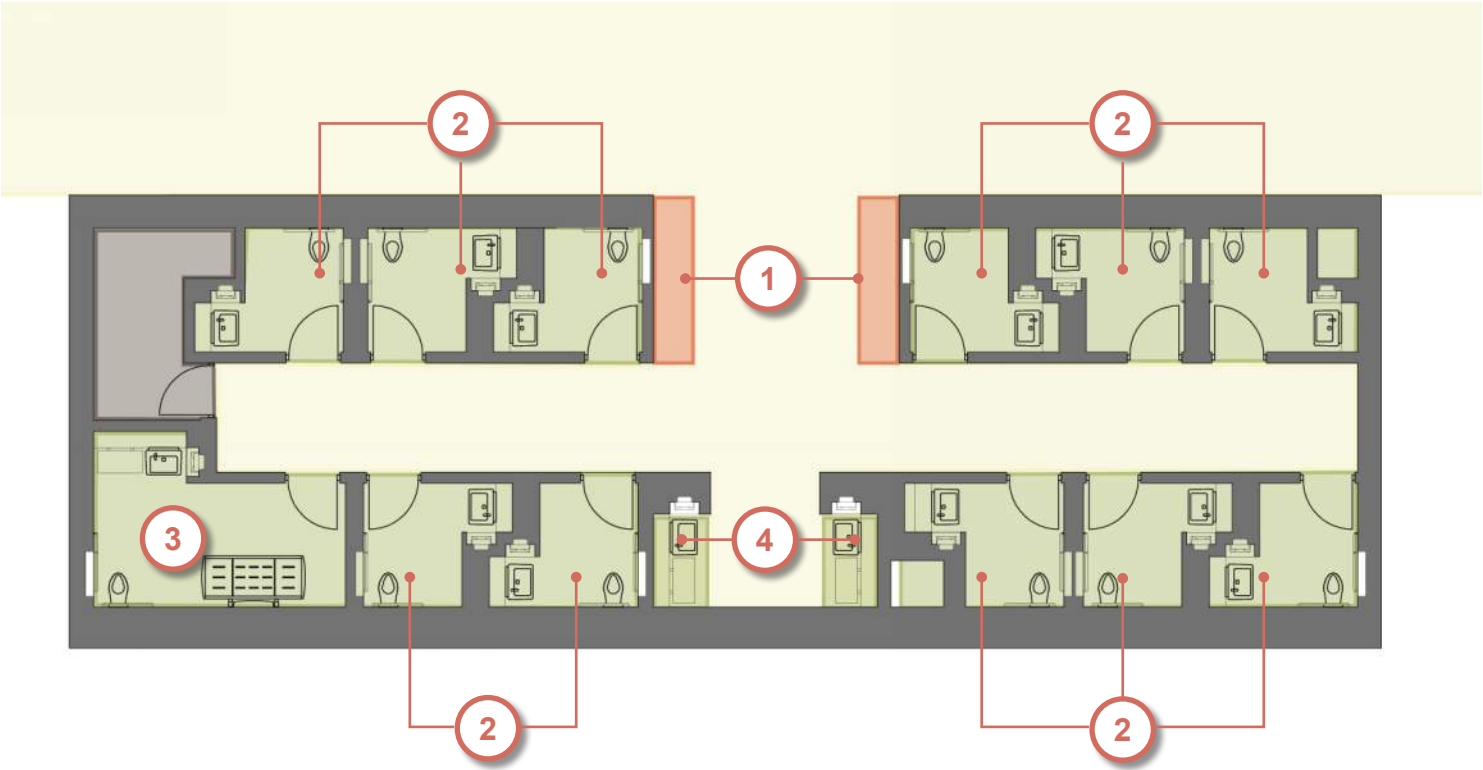
Multiple prototypes of restroom unit modules were developed, discussed, and refined according to project goals as part of this planning study. Program analysis (refer to pg. 24) estimated the total square footage required for restroom facilities based on passenger profiles and aircraft mix. The purpose of evaluating these varieties of restroom layout prototypes was to gauge the approximate square footage required for restrooms based on client and project goals. Further development of the restroom layout, finishes, fixtures, and systems will need to be conducted as part of design phases for the project.

TVC leadership indicated their priorities to create passenger comfort-focused, single-user, gender-neutral restroom modules and to provide ample space for various associated restroom accessories. These goals result in a larger footprint per user than more conventional, gender-separated restroom arrangements, but likely also increase passenger satisfaction and utilization efficiencies of the restroom facilities. At right is a prototype example of the combination of features the airport indicated as must-haves. Other restroom block prototypes studied are included in the Appendix.

BUILDING SUPPORT

Building support spaces include areas reserved for building services such as mechanical, electrical and plumbing utilities, plus information technology (IT) infrastructure. The areas allotted in Alternative 9 correspond to the estimated square footage needed according to programming analysis (refer to Table 3-1). The location of these rooms within the new layout is somewhat flexible, but they should be located in such a way to not impede or make future expansion prohibitively expensive. While some rooms may be co-located to serve centralized systems, other functions or rooms will need to be located in closer proximity to the areas that they serve. Additional building support space is also anticipated on the apron level. As the project moves into design phases, engineers on the design team will evaluate the most optimal placement and sizes of each of these space relative to the architectural configuration and design.

Initial analysis during the pre-design phase identified additional space for needed airport storage as well as expanded loading dock area to accomodate future needs. This includes area for a trash compactor as well. Per the preferred alternative, the loading dock will be relocated and size modified to meet expansion needs.



12-UNIT RESTROOM BLOCK PROTOTYPE

Not to Scale

DIAGRAM KEY NOTES

- 1. Waiting/Lounge with opportunity for art
- 2. Accessible stalls
- 3. Family/Companion Care/Changing Table restroom
- 4. Baby-Changing Nodes

04 PREFERRED ALTERNATIVE

CONCEPTUAL INTERIOR DEVELOPMENT

SERVICE ANIMAL RELIEF AREA (SARA)

To bring the facilities up to FAA requirements for Service Animal Relief Areas (SARAs), at least one SARA should be added post-security. At Cherry Capital Airport, there is a desire to provide these close to all passenger gate holdroom areas; for example, for Alternative 9, one SARA was requested per each “pod.” The provisions for these rooms can vary between airports, but at minimum should include: a turf area with flushing system; a hard, washable floor surface at the remaining area; pet waste disposal; and accommodations for hand-washing.

A recommended solution is to recess the floor slab under the turf area so that the top of the turf surface is level with the adjacent hard surface flooring, over a recessed drainage grid which houses a perimeter flushing system and a floor drain. A wall-mounted button activates the flushing system below the turf. A wall-mounted hose is used by passengers to rinse the top of the turf after each use, and staff clean the room regularly as well. Room signage provides instructions and reminders for human users to clean up after their service animal. Solid waste disposal bags and receptacles are provided. A storage closet adjacent to the turf allows storage of additional stock supplies of artificial turf. A mop sink with separate hose for cleaning soiled paws may also be provided.

Other optional amenities include but are not limited to a floor-level pet drinking fountain, wall-mounted fold-down seating, a grooming counter with mirror for the passenger, and tactile signage. A room of approximately 160 square feet can accommodate these provisions comfortably while maintaining sufficient space for accessibility. SARAs are often co-located with restrooms, grouping related passenger amenities for intuitive navigation and plumbing efficiencies.

LANDSIDE / PRE-SECURITY / TERMINAL

The Cherry Capital Airport facility has a strong aesthetic identity that has been embraced by the community and the airport leadership. Through our discussions during this pre-design process it has been determined that key areas within the Landside Terminal are functioning well and should be maintained aesthetically and functionally with minimal changes. These areas include the overall circulation zone throughout the Front Hall (encompassing Ticketing, Baggage Claim, the Fireplace Lounge, the Gift Shop and the circulation zone leading to the security checkpoint — the start of the “river”-themed circulation path leading to the concourse pod).

Selective improvements have been identified to improve the function within these areas which are described in detail in the following sections.

04 PREFERRED ALTERNATIVE

CONCEPTUAL INTERIOR DEVELOPMENT

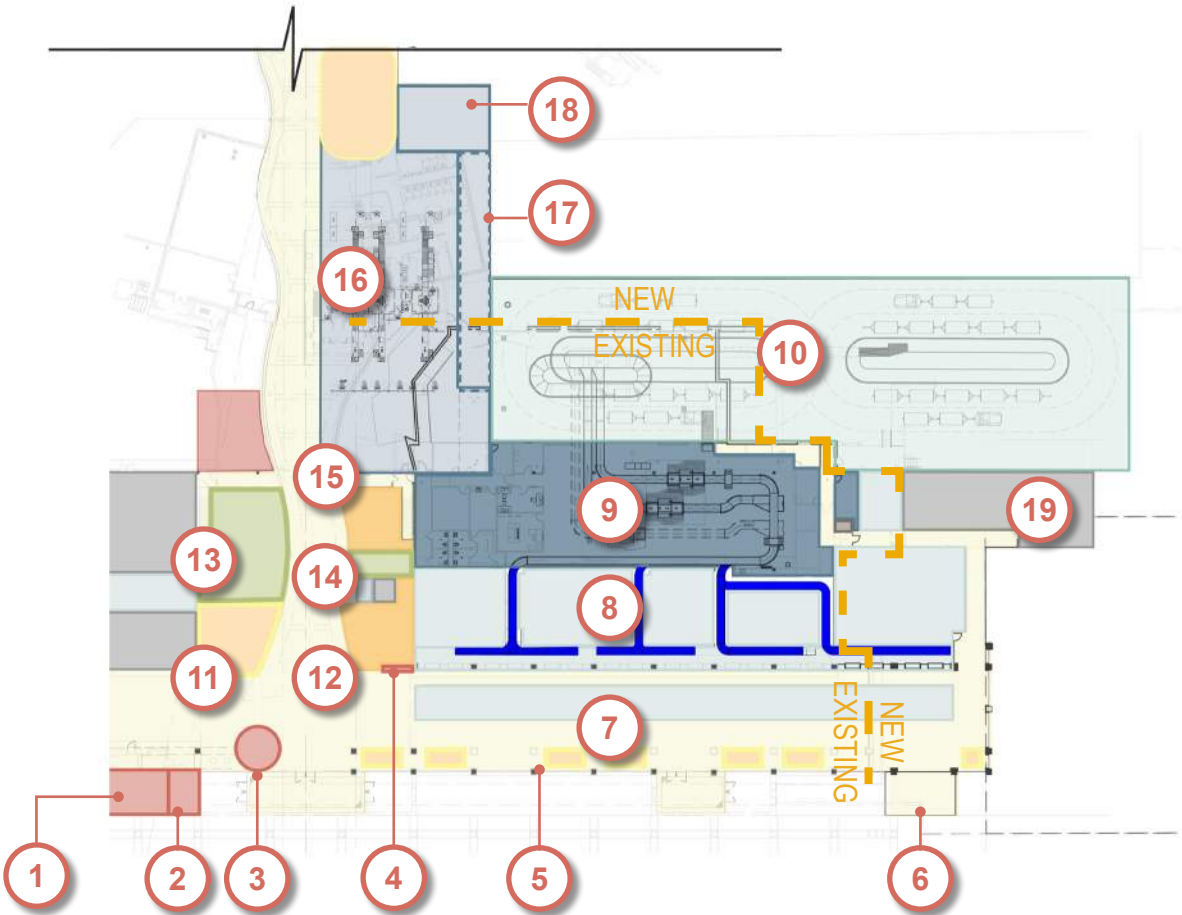
TICKETING / ATOS / BAGGAGE MAKEUP

Our review of available service counters, self-service device and queuing space indicted that additional area was needed to support these functions. The Ticketing Area was expanded from 28 to 36 counter positions with expanded queuing and self-service device area directly adjacent. Airline Ticketing Office (ATO) square footage was also increased to support the added counter frontage. The existing luggage take-back conveyors were expanded to support the expanded counter frontage.

While the existing in-line baggage screening system has capacity for the expected growth, the existing baggage make-up area was too small. Our pre-design study indicated that two makeup carousels with capacity for twenty carts were required, more than doubling the overall size of the baggage makeup area.

CENTRAL COMMONS

The Central Commons is the heart of the Landside Terminal. This zone links the pre-security zones of Ticketing, Baggage Claim and circulation leading to Security Screening Checkpoint. The pre-design review of this area has identified several adjustments to this zone that will provide greater function and passenger service without significantly changing the overall aesthetics of the space. Identified additions to the Central Commons include an Concierge Desk providing information and visitor support and centrally-located information displays with an airport directory, flight information display system (FIDS), and baggage information display system (BIDS).



PRE-SECURITY: CENTRAL COMMONS AND EAST TERMINAL

Not to Scale



DIAGRAM KEY NOTES

- | | |
|--|--|
| 1. Valet & Coat Check | 10. Expanded baggage makeup |
| 2. Business Center - existing to remain | 11. Fireplace Lounge - existing to remain |
| 3. Information desk | 12. Gift store - existing to remain |
| 4. Airport directory display | 13. Restrooms - renovated |
| 5. New lounge seating | 14. New Mothers' Room |
| 6. New vestibule | 15. Concessions - renovated |
| 7. Expanded ticketing queue | 16. Expanded Security Screening Checkpoint (SSCP) |
| 8. Expanded ticketing counters & belts; storage | 17. Area reserved for future SSCP expansion |
| 9. Explosive detection system (EDS) baggage screening area | 18. New TSA offices and private screening room (PSR) |
| | 19. Expanded loading dock and airport storage |

04 PREFERRED ALTERNATIVE

CONCEPTUAL INTERIOR DEVELOPMENT

RESTROOMS AND MOTHERS' LOUNGE

The existing restroom location within the Central Commons area is well situated to meet the needs of departing and arriving passengers as well as meeters and greeters, but the facilities are in need of updates. The suggested updates include improvements that provide better accommodations for passengers consistent with current ACRP recommendations, including three-foot wide stalls with out-swinging doors, updated hand-washing stations and updated baby changing stations. Additionally the family room was updated to better support the full range of companion care amenities, including an electric automated, adult-size changing table. Outside of the restroom zone, but within the Central Commons, a new Mothers' Lounge has been added to provide space for both nursing and lactating mothers.

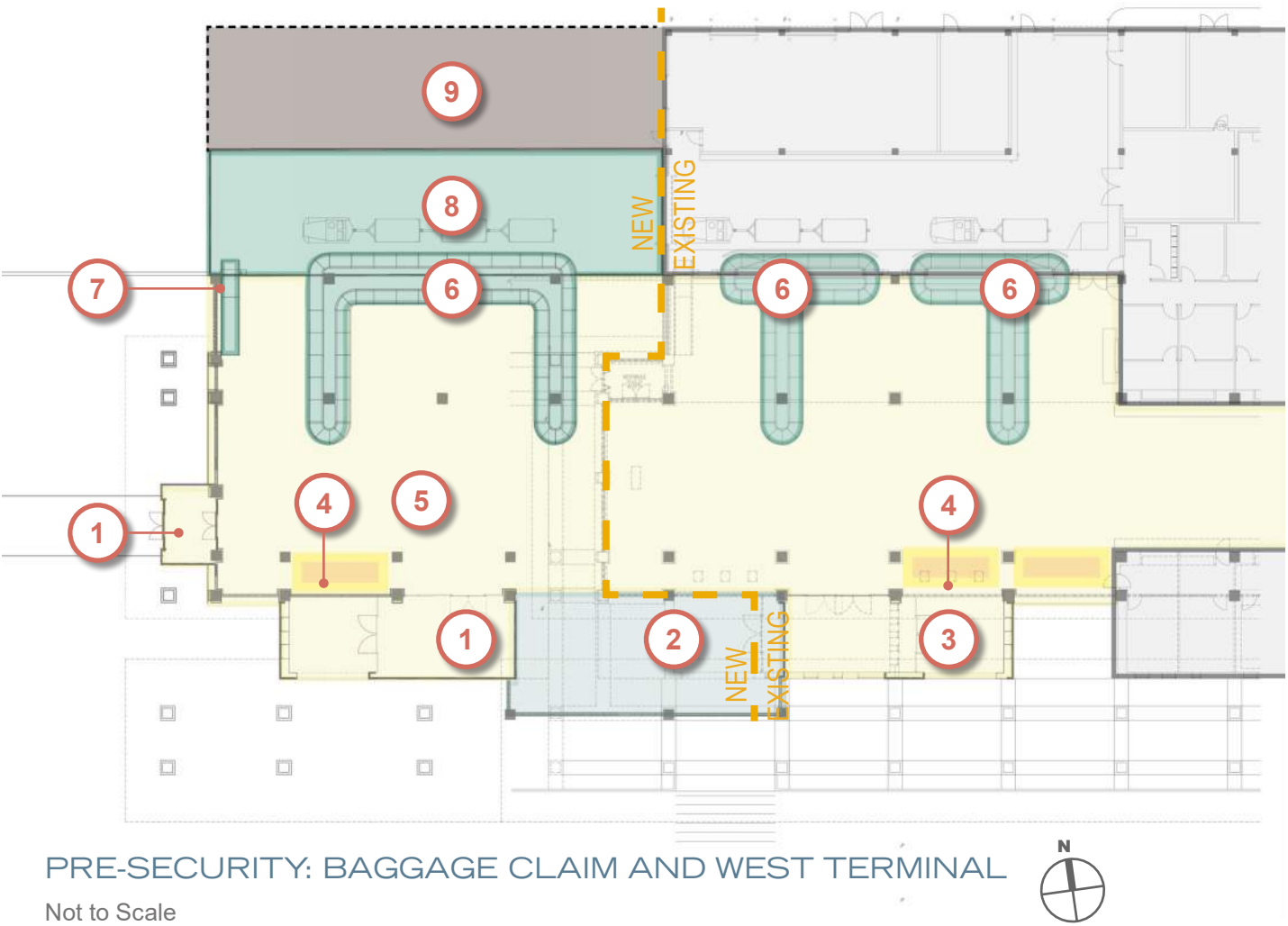
CONCIERGE / VALET & COAT CHECK / BUSINESS CENTER / FIREPLACE ROOM / OUTDOOR LOUNGE

To provide an increased level of service for passengers and guests at the Cherry Capital Airport several new amenities are proposed including Concierge, Valet & Coat Check, and a new location for the Outdoor Lounge that will be accessible to post-security passengers. An area immediately to the left of the terminal entry was identified as a preferred location for Concierge and Valet & Coat Check. Innovative technology solutions such as interactive kiosks or “avatar” / hologram devices could be deployed to offer Concierge or Information services for passengers. Additionally, the Business Center and the Fireplace Lounge are planned to be maintained in their current locations.

BAGGAGE CLAIM / RENTAL CARS / BAGGAGE LAYDOWN / BSO

The existing Baggage Claim area at TVC includes two flat-plate claim carousels. The tug drive for baggage carts is immediately to the north of the claim hall, with a pair of access doors for each carousel. An oversize bag belt with a dedicated baggage door is provided at the west end of the claim hall. A single vestibule links the claim hall to the curbside; a separate, smaller vestibule on the west end of the terminal leads toward the rental car parking lot .The airport prefers the 90-degree turn vestibules to address high wind/wind-driven rain and snow issues. The claim hall is an extension of the primary east-west volume of the terminal, with the Central Commons area linking it to the Ticketing area on the east end of the terminal. The aesthetic form, structural module, and architectural details of the Baggage Claim reflect those of the other areas of the terminal and the facility as a whole.

The airport has indicated there is limited need for baggage service offices and a single shared space has been identified. Rental car facilities are consolidated to meet the anticipated reduced square footage needed for these services. Programmed square footage is sufficient to allow space for rental car kiosks and associated queuing.



PRE-SECURITY: BAGGAGE CLAIM AND WEST TERMINAL

Not to Scale

DIAGRAM KEY NOTES

- 1. New vestibules
- 2. Expansion: rental car offices
- 3. Renovated and expanded vestibule
- 4. Lounge seating area
- 5. Expanded bag claim hall
- 6. New baggage carousels
- 7. Oversize bag belt
- 8. Tug area / bag laydown
- 9. Possible building support / infrastructure expansion

04 PREFERRED ALTERNATIVE

ALTERNATIVES EVALUATION

VESTIBULES AND CURBSIDE

As the length of the building alongside the curbside will need to increase to accommodate additional space in the ticketing and baggage claim areas, additional vestibule(s) will need to be added along the new length to accommodate required exiting. Furthermore, having additional vestibules allows integrated signage at the curbside directing passengers or those picking them up more specifically to their intended destinations. TVC leadership has expressed their desire to maintain the aesthetic, formal character of the existing vestibules, as well as their arrangement which includes a 90-degree turn in the circulation route, within the new design. The existing arrangement allows better sheltering against winds entering the building, as well as preventing a straight path of travel for any birds who might wish to enter the terminal.

As part of the anticipated expansion to occur as part of the scope of the project, the roadway curbside and canopy will also likely need to be modified and increased in length along the newly expanded portions of the façade. Additionally, TVC leadership has expressed a desire to integrate a new location for a bus stop along the curbside, as well as an expansion of the existing curbside canopy to fully cover the vehicle lanes in the roadway. A concept for one possible solution for these modifications is shown in the Appendix. The detailed design of these roadway alignment modifications is not included as part of the scope of this preliminary planning study, but they should be studied in greater detail along with roadside signage as the project moves into later design phases.

FURTHER STUDIES IN FUTURE PHASES OF DESIGN

The predesign, programming scope of a terminal planning study such as this one factors many — but not all — of the full range of inputs that influence building design and planning. Aesthetic considerations regarding form, massing, and space for artistic functions may affect the required square footage shown in this planning study.

Furthermore, there are additional considerations that will need to be studied as the project moves into later design phases, one being the layout and design of the administration areas. This study identified needs including more conference room space and a badging office and also found that some private offices are not being utilized. A reconfiguration and reallocation of the existing spaces could better utilize the available square footage.

As mechanical, electrical, and plumbing (MEP) engineering services are brought into the design and planning teams, building layouts can be further optimized for efficiencies while reserving the necessary square footage for the new systems. Any special power provisions required, such as for ground service equipment (GSE), security checkpoint equipment, and boarding bridges can be determined as the design progresses further. Further studies undertaken by MEP engineering during later design phases may also include evaluating existing systems at TVC for their expected end-of-life timeframes and determine best ways to maximize utility of the existing systems within the new design. Existing lighting systems and fixtures in areas to be modified should be evaluated for aesthetics and performance relative to the new systems. In addition to MEP considerations, as the expected scope of the project will significantly affect some of the existing areas of the terminal and concourse, it is recommended that a security consultant review the system overall, ensure it is up-to-date and meeting security needs, and propose integration of the new security systems for the new areas of the building.

Additionally, as the design of the project progresses, there will be numerous other more detailed investigations undertaken by the civil engineering, architectural, and baggage handling design teams. For example, while a concept for the location of the bus shelter is shown in this study, the layout of the terminal drive aisles and bus access should be developed further. Short-term and long-term parking needs over the coming fifteen years, as described in the parking survey included in the Appendix, should be studied relative to capacity and changes required to accommodate anticipated growth. Civil planning considerations such as aircraft ramps and de-icing operations would be developed to a greater degree of resolution through design phases than has been done as part of this early planning study. After the services of a baggage handling consultant are brought on board for the project, closer evaluation of possibilities for the laydown and makeup areas, as well as the baggage carousels and take-back belts, can be conducted and integrated further into the architectural design.

Finally, in addition to the overall aesthetic and harmonious integration of the systems described above, further architectural studies will examine any adjustments required to the base program square footage shown in this study’s diagrams to accommodate project-specific goals related to form and character. Airport leadership has expressed the desire to maintain and enhance the “resort-like” feel of the current facility within the design for the new areas. These goals can be achieved architecturally in a variety of ways, including via finishes and form. These decisions will necessitate adjustments to the final layout as well as the resulting square footage.

Architectural finishes in new and modified areas will be studied in conjunction with the airport and stakeholders to achieve design intent. Related to passenger flow, implementation of latest technologies such as touch-free devices and mobile check-in units will be evaluated in later design phases. The plan concepts shown in this study do not preclude the integration of new technology systems.



05

ROUGH ORDER OF MAGNITUDE (ROM) COST ESTIMATE

05 ROM COSTING

PREFERRED ALTERNATIVE

ROM COSTING SUMMARY

A high-level Rough Order of Magnitude (ROM) cost was developed for Alternative 9. This analysis includes “Low” and “High” unit costs providing a range of probable costs for the project. These high-level unit costs were provided based on comparable Allliance projects throughout the country and pertain to the building and baggage handling systems only. These costs represent 2021 construction dollars without escalation.

The ROM costs are broken down into seven main categories:

- 1. Terminal Departure:** ticket lobby/ATO building expansion and existing renovations, and baggage makeup building and device expansion.
- 2. Terminal Arrivals:** baggage claim hall building expansion and renovation and new baggage claim device(s).
- 3. Terminal Commons:** existing public area renovations, and miscellaneous area renovations.
- 4. TSA Security Screening Checkpoint (SSCP):** includes both existing area renovations and building expansion.
- 5. Concourse Expansion/Renovation:** includes new concourse/connector building expansion, existing area renovations, and PBB relocations and installations.
- 6. Civil Site Work:** includes apron asphalt and concrete material as well as general surface and parking structure parking.
- 7. Miscellaneous Areas:** includes curbside canopy, covered GSE storage area, loading dock, and Airport Administration renovations.

Total project costs include the following:

- Direct costs
- Twenty-percent soft costs added to project construction direct costs
- Ten-percent owner contingency cost added to project construction direct costs

05 ROM COSTING

PREFERRED ALTERNATIVE

PROJECT	QTY	Unit	Unit Cost		Estimate	
			Low	High	Low	High
TERMINAL DEPARTURES						
Ticket Hall Building Expansion (counters, queue, circulation, vestibules, ATO, airport storage)	6,975	SF	\$400	\$600	\$ 2,790,000	\$ 4,185,000
Existing Ticket Hall Renovations (counters, queue, circulation, vestibules)	10,118	SF	\$100	\$200	\$ 1,011,800	\$ 2,023,600
Existing ATO Renovations/Storage/TSA Offices/IT-Comm	5,546	SF	\$100	\$200	\$ 554,600	\$ 1,109,200
Baggage Makeup (existing + new expansion)	20,392	SF	\$250	\$350	\$ 5,098,000	\$ 7,137,200
Baggage Handling Equipment (ticket counter conveyor lines, sortation conveyor lines, 2 make-up device:	700	LF	\$4,300	\$5,805	\$ 3,010,000	\$ 4,063,500
Subtotal Direct Costs	43,031	SF			\$ 12,464,400	\$ 18,518,500
TERMINAL ARRIVALS						
Arrivals Hall Building Expansion (claim area, bag laydown, rental car, circulation, vestibules)	11,863	SF	\$350	\$450	\$ 4,152,050	\$ 5,338,350
Existing Arrivals Hall Renovations (claim area, circulation, vestibules)	7,824	SF	\$100	\$200	\$ 782,400	\$ 1,564,800
New Flat Plate Baggage Claim Device	386	LF	\$2,600	\$3,510	\$ 1,003,600	\$ 1,354,860
Subtotal Direct Costs	19,687	SF			\$ 5,938,050	\$ 8,258,010
TERMINAL COMMONS						
Restroom Renovations/Mother's Room/SARA	2,418	SF	\$250	\$350	\$ 604,500	\$ 846,300
Food & Beverage/Seating Renovations	635	SF	\$100	\$200	\$ 63,500	\$ 127,000
Outdoor Patio/Lounge	898	SF	\$100	\$200	\$ 89,800	\$ 179,600
Valet/Coat Check Counters & Information Desk	714	SF	\$400	\$600	\$ 285,600	\$ 428,400
Miscellaneous Renovations (valet/coat check offices, airport storage, circulation)	10,151	SF	\$100	\$200	\$ 1,015,100	\$ 2,030,200
Subtotal Direct Costs	14,816	SF			\$ 2,058,500	\$ 3,611,500
TSA SECURITY SCREENING CHECKPOINT (SSCP)						
Building Expansion	11,318	SF	\$350	\$450	\$ 3,961,300	\$ 5,093,100
Existing Renovations	2,473	SF	\$100	\$200	\$ 247,300	\$ 494,600
Subtotal Direct Costs	13,791	SF			\$ 4,208,600	\$ 5,587,700
CONCOURSE EXPANSION/RENOVATION						
New Concourse (includes 20% additional apron level tempered space)	69,253	SF	\$450	\$600	\$ 31,163,850	\$ 41,551,800
New Concourse Corridor Connectors	31,838	SF	\$350	\$500	\$ 11,143,300	\$ 15,919,000
Existing Concourse Renovations	10,652	SF	\$100	\$200	\$ 1,065,200	\$ 2,130,400
Passenger Boarding Bridge (PBB) Relocation	1	EA	\$75,000	\$150,000	\$ 75,000	\$ 150,000
New PBB (Including foundations, PCA, GPU)	13	EA	\$700,000	\$1,000,000	\$ 9,100,000	\$ 13,000,000
Subtotal Direct Costs	111,743	SF			\$ 52,547,350	\$ 72,751,200
CIVIL SITE WORK						
¹ Apron	1	LS			\$ 34,000,000	\$ 38,000,000
² Parking	1	LS			\$ 17,500,000	\$ 40,000,000
Subtotal Direct Costs	0	SF			\$ 51,500,000	\$ 78,000,000
MISCELLANEOUS						
Curbside Canopy	550	LF	\$3,000	\$5,000	\$ 1,650,000	\$ 2,750,000
GSE Covered Storage (@bag makeup)	11,263	SF	\$200	\$300	\$ 2,252,600	\$ 3,378,900
Loading Dock	1,004	SF	\$200	\$300	\$ 200,800	\$ 301,200
Airport Administration Renovations (includes Airport Police)	6,771	SF	\$100	\$200	\$ 677,100	\$ 1,354,200
Subtotal Direct Costs	19,038	SF			\$ 4,780,500	\$ 7,784,300
DIRECT COST TOTAL	222,106	SF	\$601	\$876	\$ 133,497,400	\$ 194,511,210
SOFT COSTS	20%				\$ 26,699,480	\$ 38,902,242
OWNER CONTINGENCY	10%				\$ 13,349,740	\$ 19,451,121
TOTAL AIRPORT PROJECT COST					\$ 173,546,620	\$ 252,864,573

***Concept Estimate for both Concourse B + Concourse C

Notes:

¹ Apron costs include consideration of the new drainage system studied and asphalt or concrete materials

² Parking costs include general surface and parking structure parking



06

ANTICIPATED SPACE ELIGIBILITY FOR AIP AND PFC

06 ANTICIPATED AIP/PFC ELIGIBILITY

PREFERRED ALTERNATIVE

INTRODUCTION

As Cherry Capital Airport (TVC) is included in the National Plan of Integrated Airport Systems (NPIAS), designated as a primary commercial service airport, it is eligible to receive Airport Improvement Program (AIP) funding through the Federal Aviation Administration (FAA) for projects that meet requirements stipulated by the FAA. These criteria are described in the FAA's AIP Handbook. Generally, costs for construction, reconstruction, or rehabilitation may be eligible for funding, while maintenance is considered ineligible. The AIP Handbook defines eligibility as “public use areas that are directly related to the movement of passengers and baggage in terminal facilities.”

ANTICIPATED ELIGIBLE AREAS

The charts on the following pages represents areas of the project currently anticipated to be eligible to receive funding through AIP or other federal funding sources. The FAA Airport District Office (ADO) serving TVC based in Detroit will be responsible for reviewing and determining the project’s actual eligibility for AIP/PFC funding.

06 ANTICIPATED AIP/PFC ELIGIBILITY

PREFERRED ALTERNATIVE

TVC - Cherry Capital Airport							
AIP Eligibility for Proposed Project - Alternative 9							
Name	Gross SF	AIP Eligibility Y/N/P	AIP Eligible Area (SF)	AIP Ineligible Area (SF)	AIP Prorated Area (SF)	Resulting AIP Prorated Area (SF)	Notes (Select use category)
TERMINAL							
PUBLIC SPACE							
Circulation							
Ticket Lobby	4,828	Y	4,828	-	-	-	- Public use
Baggage Claim	4,042	Y	4,042	-	-	-	- Public use
General Public/Corridors	10,276	Y	10,276	-	-	-	- Public use
Vestibules	2,956	Y	2,956	-	-	-	- Public use
Subtotal	22,102		22,102	-	-	-	
Waiting Areas							
Public Seating	1,285	Y	1,285	-	-	-	- Public use
Meeter/Greeter Areas	-	Y	-	-	-	-	- Public use
Subtotal	1,285		1,285	-	-	-	
Baggage Claim							
Claim Retrieval Area	9,637	Y	9,637	-	-	-	- Public use
Subtotal	9,637		9,637	-	-	-	
Restrooms							
Landside Men's/Women's	1,481	Y	1,481	-	-	-	- Public use
Family/Companion Care	206	Y	206	-	-	-	- Public use
Subtotal	1,687		1,687	-	-	-	
Other Areas							
Information/Concierge	422	Y	422	-	-	-	- Public use
Outdoor Lounge	898	Y	898	-	-	-	- Public use
Nursing Mother's Room	312	Y	312	-	-	-	- Public use
SARA	419	Y	419	-	-	-	- Public use
Subtotal	2,051		2,051	-	-	-	
AIRLINE SPACE							
Check-In							
Ticket Counter Area	3,283	N	-	3,283	-	-	- Airline use
Ticket Queue	4,633	Y	4,633	-	-	-	- Public use
Airline Offices/ATO	5,954	N	-	5,954	-	-	- Airline use
Corridors	1,497	N	-	1,497	-	-	- Airline use
Restrooms	-	N	-	-	-	-	- Airline use
Subtotal	15,367		4,633	10,734	-	-	
Baggage Claim							
Baggage Service Offices (BSO)	-	Y	-	-	-	-	- Public use
Inbound Bag Laydown/Tug Drive	2,782	N	-	2,782	-	-	- Airline use
Subtotal	2,782		-	2,782	-	-	
Other Airline Space							
Outbound Bag Make-Up/Tug Drive	20,392	N	-	20,392	-	-	- Airline use
Airline Storage	-	N	-	-	-	-	- Airline use
Other Ops/Support Areas	450	N	-	450	-	-	- Airline use
Subtotal	20,842		-	20,842	-	-	
TSA SPACE							
EDS Baggage Screening							
Baggage Screening	-	N	-	-	-	-	- Airline use
Subtotal	-		-	-	-	-	
Security Screening Checkpoint							
Queue Area	2,417	Y	2,417	-	-	-	- Public use
Passenger Screening Area (SSCP shell space)	7,851	Y	7,851	-	-	-	- Public use
Private Screening Room (PSR)	100	Y	100	-	-	-	- Public use
Offices/Break/Storage	950	N	-	950	-	-	- Non Public use
Restrooms	-	N	-	-	-	-	- Non Public use
Subtotal	11,318		10,368	950	-	-	
Other Areas							
Offices/Break/Storage	225	N	-	225	-	-	- Non Public use
Subtotal	225		-	225	-	-	
CONCESSIONS							
Food & Beverage/Retail (shell space)	635	Y	635	-	-	-	- Public use
Prep/Storage/Offices	-	N	-	-	-	-	- Non Public use
Rental Car Counter	698	Y	698	-	-	-	- Public use
Rental Car Offices	1,185	N	-	1,185	-	-	- Non Public use
Valet/Coat Check	911	Y	911	-	-	-	- Public use
Subtotal	3,429		2,244	1,185	-	-	
NON-PUBLIC SPACE							
Non-Airline Tenant Space							
Airport Administration (Offices/Restrooms/etc.)	5,942	N	-	5,942	-	-	- Non Public use
Airport Police	136	N	-	136	-	-	- Non Public use
Circulation/Corridors	693	N	-	693	-	-	- Non Public use
Subtotal	6,771		-	6,771	-	-	
Airport Operations							
Maintenance Rooms	-	N	-	-	-	-	- Building Support
Janitorial	-	N	-	-	-	-	- Building Support
Storage (GSE, etc.)	11,263	N	-	11,263	-	-	- Storage
Subtotal	11,263		-	11,263	-	-	
Building Systems							
Mechanical/Electrical/Plumbing	-	P	-	-	-	-	- MEP/Telecom
Communications//Telecom	600	P	-	-	600	405	- MEP/Telecom
Loading Dock	1,004	N	-	1,004	-	-	- Non Public use
Subtotal	1,604		-	1,004	600	405	
Total Terminal Gross Area (SF)	110,363		54,007	55,756	600	405	

TVC - Cherry Capital Airport							
AIP Eligibility for Proposed Project - Alternative 9							
Name	Gross SF	AIP Eligibility Y/N/P	AIP Eligible Area (SF)	AIP Ineligible Area (SF)	AIP Prorated Area (SF)	Resulting AIP Prorated Area (SF)	Notes (Select use category)
CONCOURSE							
PUBLIC SPACE							
Concourse/Connecting Corridors	48,748	Y	48,748	-	-	-	- Public use
Passenger Holdrooms	33,380	Y	33,380	-	-	-	- Public use
Airside Men's/Women's Restrooms	5,288	Y	5,288	-	-	-	- Public use
Family Companion Care Rooms	240	Y	240	-	-	-	- Public use
Nursing Mother's Rooms	128	Y	128	-	-	-	- Public use
SARA	144	Y	144	-	-	-	- SARA
Amenity Areas (Business Center, Children's Play, etc.)	3,069	Y	3,069	-	-	-	- Public use
Subtotal	90,997		90,997	-	-	-	
CONCESSIONS							
Food & Beverage/Retail (shell space)	3,210	Y	3,210	-	-	-	- Public use
Prep/Storage/Offices	1,722	N	-	1,722	-	-	- Non Public use
Subtotal	4,932		3,210	1,722	-	-	
AIRLINE SPACE							
Airline Operations	9,000	N	-	9,000	-	-	- Airline use
Airline Storage	3,400	N	-	3,400	-	-	- Airline use
Subtotal	12,400		-	12,400	-	-	
NON-PUBLIC SPACE							
Airport Operations							
Maintenance Rooms	747	N	-	747	-	-	- Building Support
Janitorial	575	N	-	575	-	-	- Building Support
Storage (GSE, etc.)	-	N	-	-	-	-	- Storage
Subtotal	1,322		-	1,322	-	-	
Building Systems							
Mechanical/Electrical/Plumbing	1,792	P	-	-	1,792	1,210	- MEP/Telecom
Communications/Telecom	300	P	-	-	300	203	- MEP/Telecom
Subtotal	2,092		-	-	2,092	1,413	
Total Concourse Gross Area (SF)	111,743		94,207	15,444	2,092	1,413	
GRAND TOTAL							
Terminal	110,363		54,007	55,756	600	405	
Concourse	111,743		94,207	15,444	2,092	1,413	
Total	222,106		148,214	71,200	2,692	1,818	
Total AIP 100% Eligible + Resulting Prorated Space % of Total Gross SF							
150,032 67.5%							
AIP Proration Calculation							
Total AIP Eligible + Ineligible Space (Excludes prorated space)							
219,414							
Total AIP 100% Eligible Space							
148,214							
AIP % Eligible to (E+I) Space							
67.5%							

Notes:

¹Included in new concourse

²Covered GSE storage @bag makeup area

06 ANTICIPATED AIP/PFC ELIGIBILITY

PREFERRED ALTERNATIVE

TVC - Cherry Capital Airport							
PFC Eligibility for Proposed Project - Alternative 9							
Name	Gross SF	PFC Eligibility Y/N/P	PFC Eligible Area (SF)	PFC Ineligible Area (SF)	PFC Prorated Area (SF)	Resulting PFC Prorated Area (SF)	Notes (Select use category)
TERMINAL							
PUBLIC SPACE							
Circulation							
Ticket Lobby	4,828	Y	4,828	-	-	-	- Public use
Baggage Claim	4,042	Y	4,042	-	-	-	- Public use
General Public/Corridors	10,276	Y	10,276	-	-	-	- Public use
Vestibules	2,956	Y	2,956	-	-	-	- Public use
Subtotal	22,102		22,102	-	-	-	
Waiting Areas							
Public Seating	1,285	Y	1,285	-	-	-	- Public use
Meeter/Greeter Areas	-	Y	-	-	-	-	- Public use
Subtotal	1,285		1,285	-	-	-	
Baggage Claim							
Claim Retrieval Area	9,637	Y	9,637	-	-	-	- Public use
Subtotal	9,637		9,637	-	-	-	
Restrooms							
Landside Men's/Women's	1,481	Y	1,481	-	-	-	- Public use
Family/Companion Care	206	Y	206	-	-	-	- Public use
Subtotal	1,687		1,687	-	-	-	
Other Areas							
Information/Concierge	422	Y	422	-	-	-	- Public use
Outdoor Lounge	898	Y	898	-	-	-	- Public use
Nursing Mother's Room	312	Y	312	-	-	-	- Public use
SARA	419	Y	419	-	-	-	- Public use
Subtotal	2,051		2,051	-	-	-	
AIRLINE SPACE							
Check-In							
Ticket Counter Area	3,283	Y	3,283	-	-	-	- Public use
Ticket Queue	4,633	Y	4,633	-	-	-	- Public use
Airline Offices/ATO	5,954	N	-	5,954	-	-	- Airline use
Corridors	1,497	N	-	1,497	-	-	- Airline use
Restrooms	-	N	-	-	-	-	- Airline use
Subtotal	15,367		7,916	7,451	-	-	
Baggage Claim							
Baggage Service Offices (BSO)	-	Y	-	-	-	-	- Public use
Inbound Bag Laydown/Tug Drive	2,782	Y	2,782	-	-	-	- Public use
Subtotal	2,782		2,782	-	-	-	
Other Airline Space							
Outbound Bag Make-Up/Tug Drive	20,392	Y	20,392	-	-	-	- Public use
Airline Storage	-	N	-	-	-	-	- Airline use
Other Ops/Support Areas	450	N	-	450	-	-	- Airline use
Subtotal	20,842		20,392	450	-	-	
TSA SPACE							
EDS Baggage Screening							
Baggage Screening	-	Y	-	-	-	-	- Public use
Subtotal	-		-	-	-	-	
Security Screening Checkpoint							
Queue Area	2,417	Y	2,417	-	-	-	- Public use
Passenger Screening Area (SSCP shell space)	7,851	Y	7,851	-	-	-	- Public use
Private Screening Room (PSR)	100	Y	100	-	-	-	- Public use
Offices/Break/Storage	950	N	-	950	-	-	- Non Public use
Restrooms	-	N	-	-	-	-	- Non Public use
Subtotal	11,318		10,368	950	-	-	
Other Areas							
Offices/Break/Storage	225	N	-	225	-	-	- Non Public use
Subtotal	225		-	225	-	-	
CONCESSIONS							
Food & Beverage/Retail (shell space)	635	Y	635	-	-	-	- Public use
Prep/Storage/Offices	-	N	-	-	-	-	- Non Public use
Rental Car Counter	698	Y	698	-	-	-	- Public use
Rental Car Offices	1,185	N	-	1,185	-	-	- Non Public use
Valet/Coat Check	911	Y	911	-	-	-	- Public use
Subtotal	3,429		2,244	1,185	-	-	
NON-PUBLIC SPACE							
Non-Airline Tenant Space							
Airport Administration (Offices/Restrooms/etc.)	5,942	N	-	5,942	-	-	- Non Public use
Airport Police	136	N	-	136	-	-	- Non Public use
Circulation/Corridors	693	N	-	693	-	-	- Non Public use
Subtotal	6,771		-	6,771	-	-	
Airport Operations							
Maintenance Rooms	-	N	-	-	-	-	- Building Support
Janitorial	-	N	-	-	-	-	- Building Support
Storage (GSE, etc.)	11,263	N	-	11,263	-	-	- Storage
Subtotal	11,263		-	11,263	-	-	
Building Systems							
Mechanical/Electrical/Plumbing	-	P	-	-	-	-	- MEP/Telecom
Communications//Telecom	600	P	-	-	600	478	- MEP/Telecom
Loading Dock	1,004	N	-	1,004	-	-	- Non Public use
Subtotal	1,604		-	1,004	600	478	
Total Terminal Gross Area (SF)	110,363		80,464	29,299	600	478	

TVC - Cherry Capital Airport							
PFC Eligibility for Proposed Project - Alternative 9							
Name	Gross SF	PFC Eligibility Y/N/P	PFC Eligible Area (SF)	PFC Ineligible Area (SF)	PFC Prorated Area (SF)	Resulting PFC Prorated Area (SF)	Notes (Select use category)
CONCOURSE							
PUBLIC SPACE							
Concourse/Connecting Corridors	48,748	Y	48,748	-	-	-	- Public use
Passenger Holdrooms	33,380	Y	33,380	-	-	-	- Public use
Airside Men's/Women's Restrooms	5,288	Y	5,288	-	-	-	- Public use
Family Companion Care Rooms	240	Y	240	-	-	-	- Public use
Nursing Mother's Rooms	128	Y	128	-	-	-	- Public use
Building Systems	144	Y	144	-	-	-	- SARA
Amenity Areas (Business Center, Children's Play, etc.)	3,069	Y	3,069	-	-	-	- Public use
Subtotal	90,997		90,997	-	-	-	
CONCESSIONS							
Food & Beverage/Retail (shell space)	3,210	Y	3,210	-	-	-	- Public use
Prep/Storage/Offices	1,722	N	-	1,722	-	-	- Non Public use
Subtotal	4,932		3,210	1,722	-	-	
AIRLINE SPACE							
Airline Operations	9,000	N	-	9,000	-	-	- Airline use
Airline Storage	3,400	N	-	3,400	-	-	- Airline use
Subtotal	12,400		-	12,400	-	-	
NON-PUBLIC SPACE							
Airport Operations							
Maintenance Rooms	747	N	-	747	-	-	- Building Support
Janitorial	575	N	-	575	-	-	- Building Support
Storage (GSE, etc.)	-	N	-	-	-	-	- Storage
Subtotal	1,322		-	1,322	-	-	
Building Systems							
Mechanical/Electrical/Plumbing	1,792	P	-	-	1,792	1,427	- MEP/Telecom
Communications/Telecom	300	P	-	-	300	239	- MEP/Telecom
Subtotal	2,092		-	-	2,092	1,665	
Total Concourse Gross Area (SF)	111,743		94,207	15,444	2,092	1,665	
GRAND TOTAL							
Terminal	110,363		80,464	29,299	600	478	
Concourse	111,743		94,207	15,444	2,092	1,665	
Total	222,106		174,671	44,743	2,692	2,143	

Total PFC 100% Eligible + Resulting Prorated Space	176,814
% of Total Gross SF	79.6%

PFC Proration Calculation	
Total PFC Eligible + Ineligible Space (Excludes prorated space)	219,414
Total PFC 100% Eligible Space	174,671
PFC % Eligible to (E+I) Space	79.6%

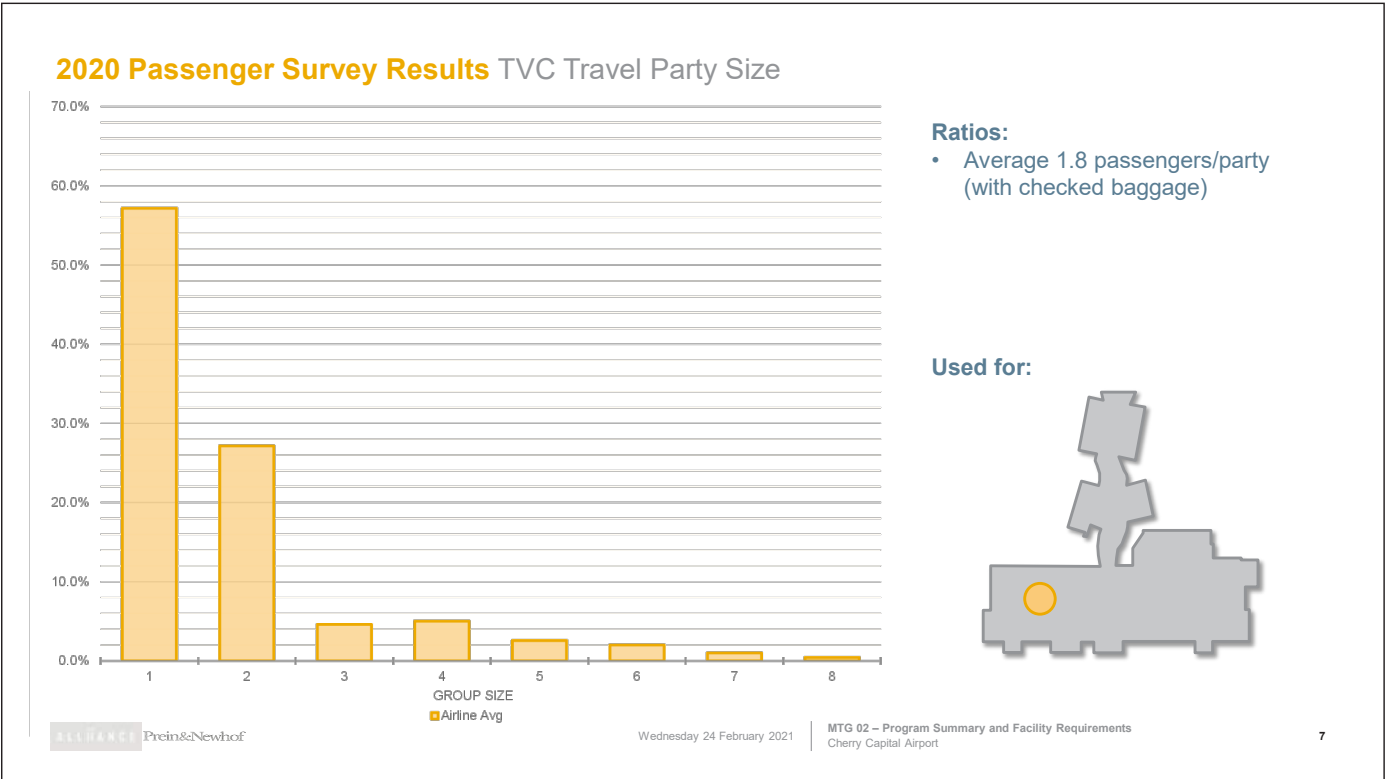
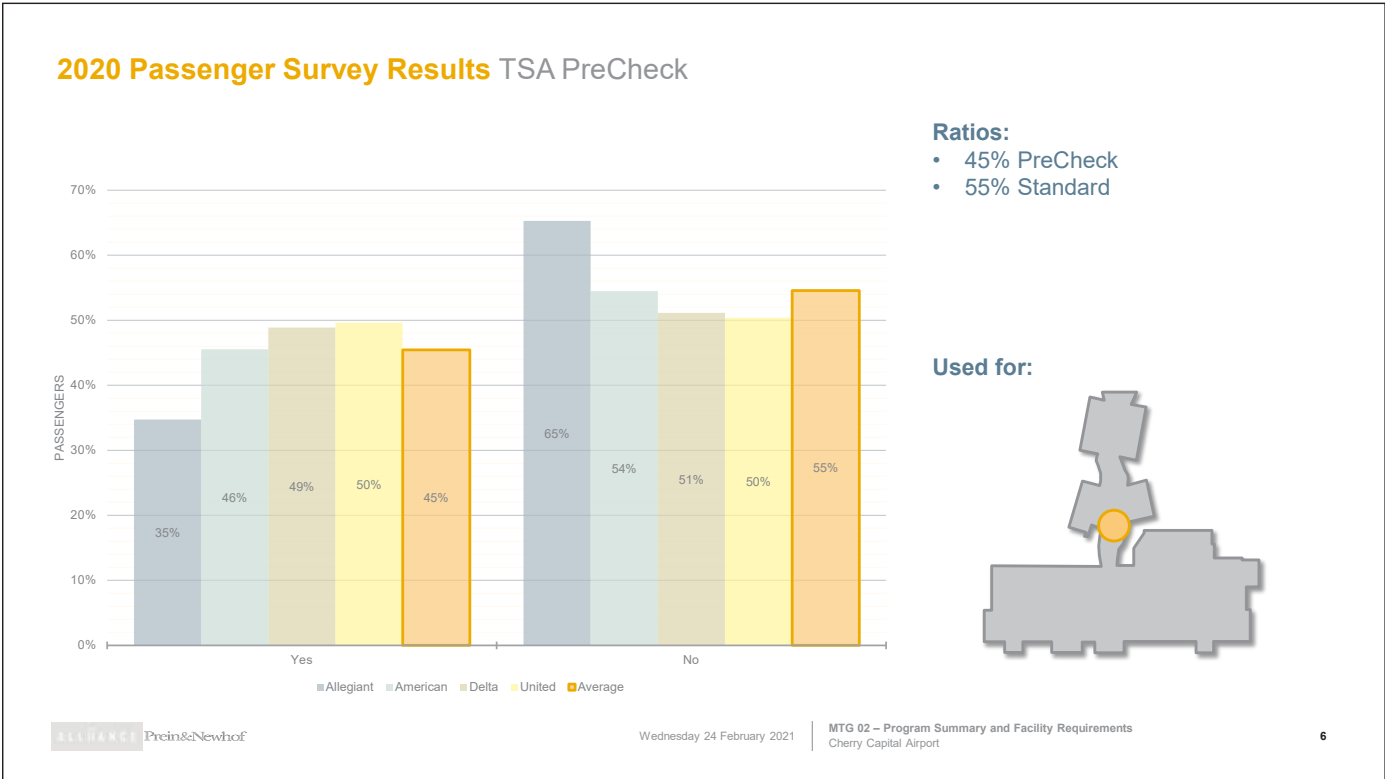
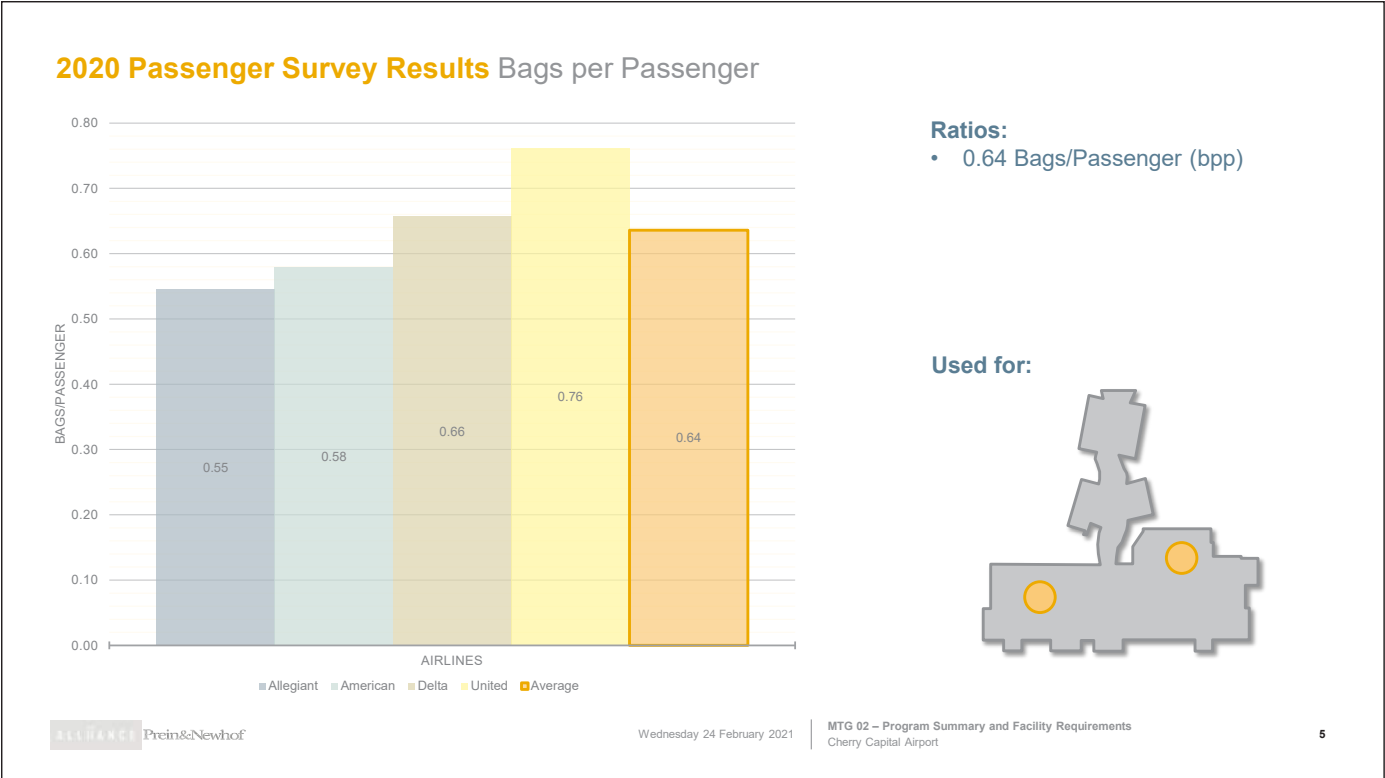
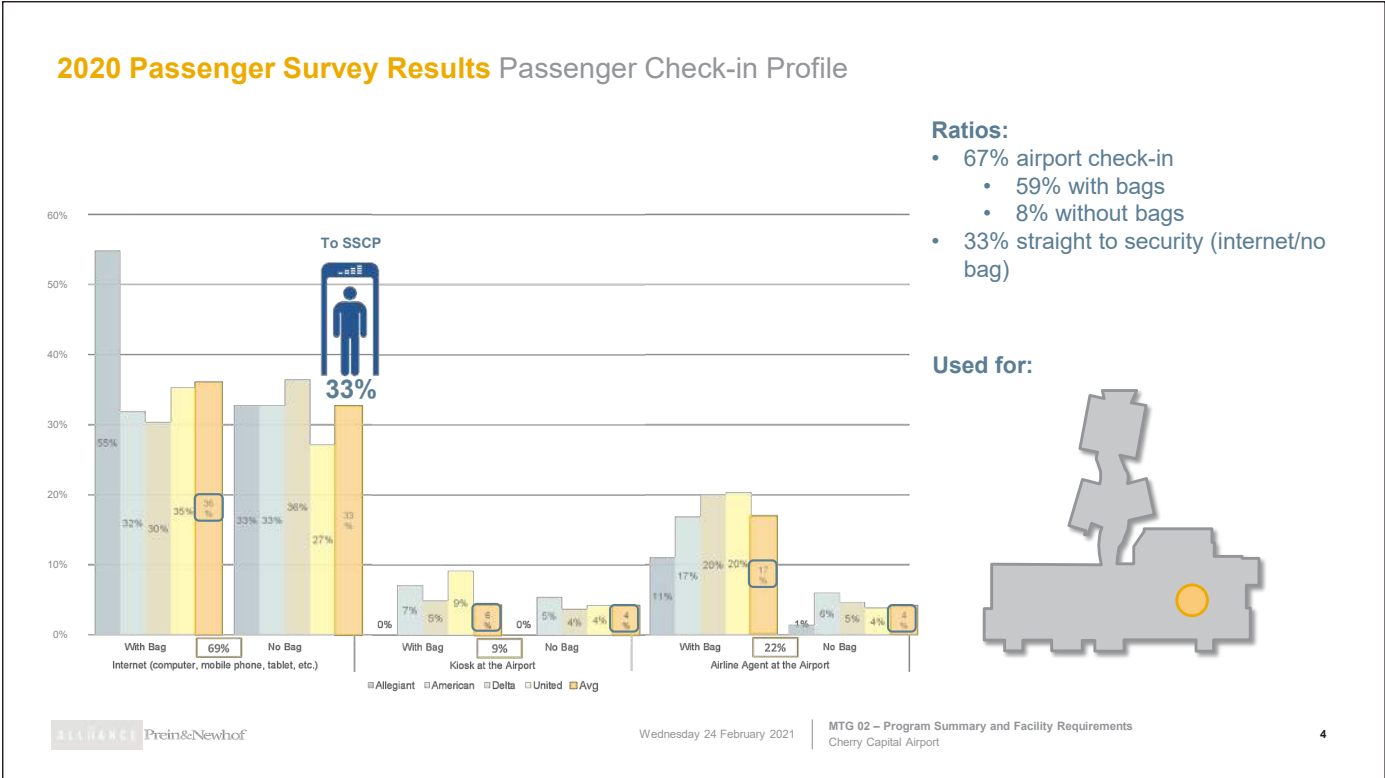
Notes:
¹Included in new concourse
²Covered GSE storage @bag makeup area

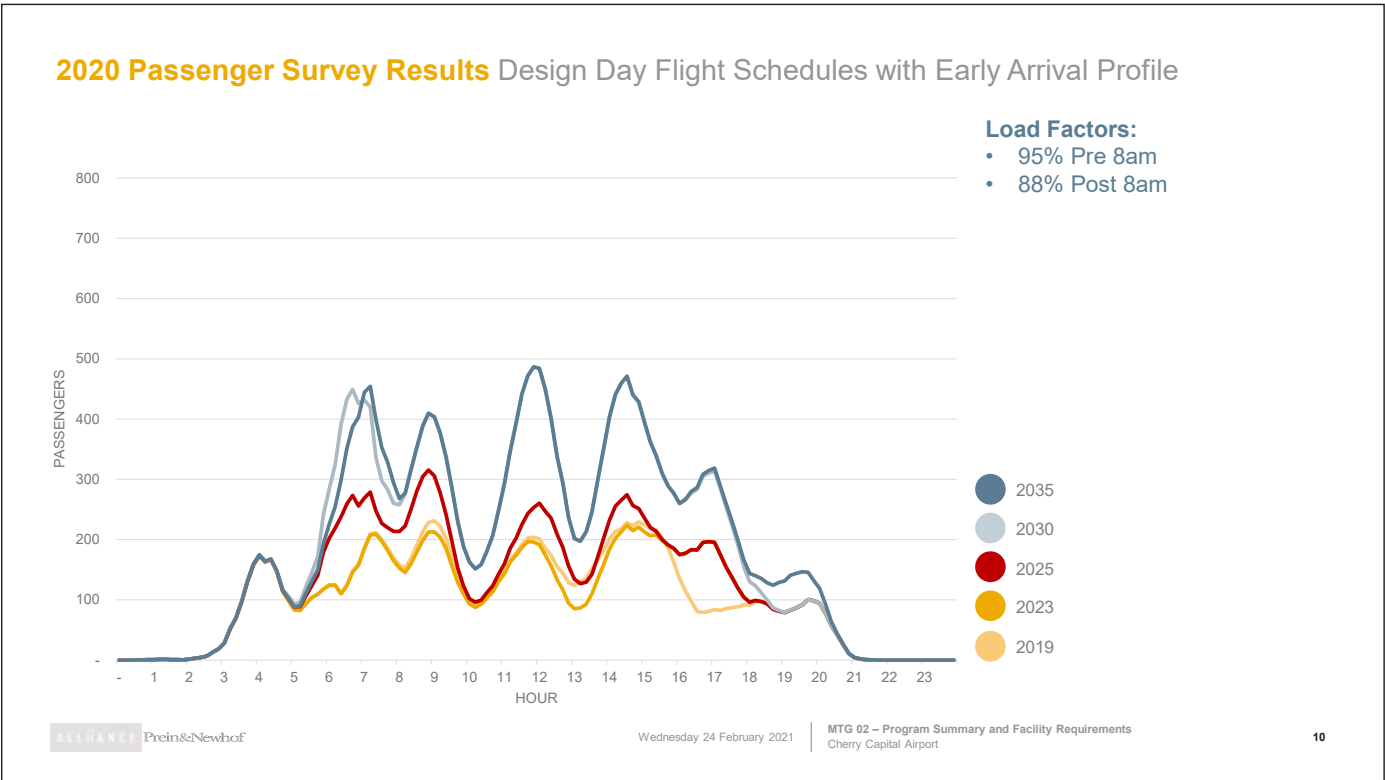
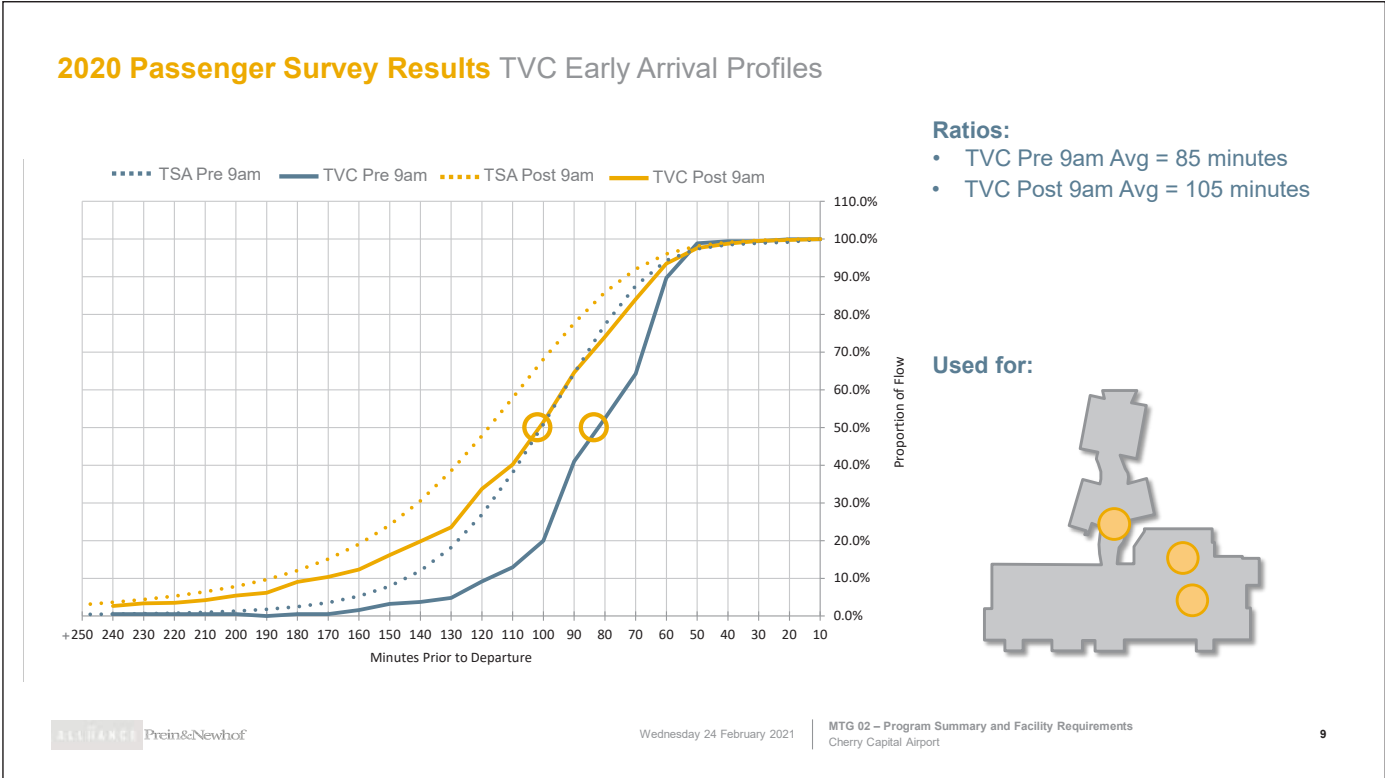
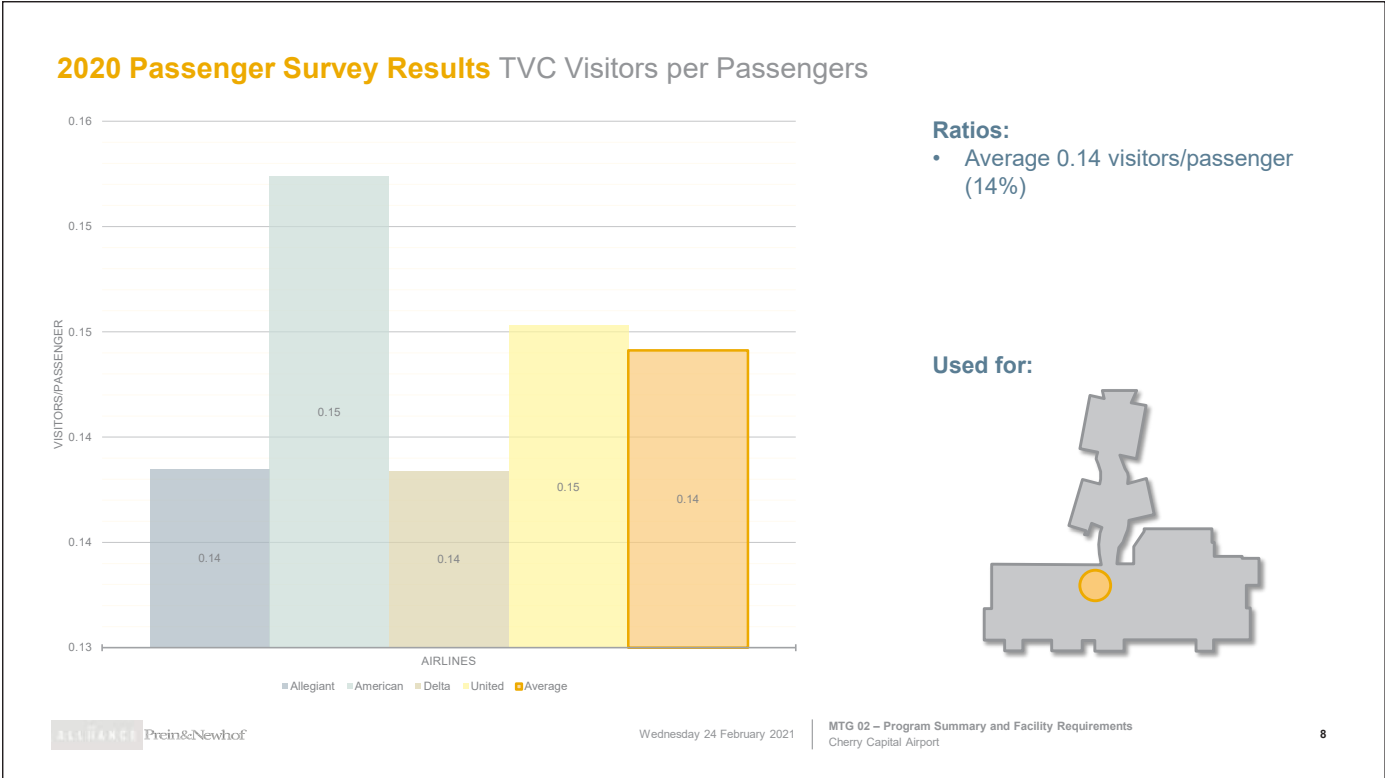


APPENDIX

A: 2020 Passenger Survey Results	37
B: Commercial Service Activity Forecasts (2020-2035)	39
C: Facility Requirements Planning Assumptions	40
D: Detailed Space Program	43
E: Site Configuration — Initial Alternatives	48
F: Site Configuration — Curbside	57
G: Site Configuration — Part 77 Analysis	58
H: Site Configuration and Walking Distances	59
I: Baggage Makeup Area / Tug Traffic Clearances	60
J: Initial Alternatives — Interior Development	61
K: Additional Restroom Concept Prototypes	63
L: Prototypical Gate Holdroom Configuration	64
M: Concessionaire Survey	65
N: Parking Survey and Future Needs	75
O: Photo Inventory of Existing Conditions	86

A: 2020 PASSENGER SURVEY RESULTS





APPENDIX

B: COMMERCIAL SERVICE ACTIVITY FORECASTS (2020-2035)

Separate from but supporting this Terminal Planning Study, Prein&Newhof prepared Commercial Service Activity Forecasts for the years 2020-2035 for TVC. The results of the forecasting informed the planning of the facilities conducted as part of this Terminal Planning Study. The forecast document is included as a standalone complement to this report.

C: FACILITY REQUIREMENTS PLANNING ASSUMPTIONS

Below is a summary of the planning assumptions used when determining the required space based on program for the new facility.

TVC Facility Requirements Planning Assumptions

The sections below outline the major passenger processing and building support spaces and the general assumptions used to calculate future requirements.

Ticketing and Check-In

This airline function is based on the Peak Hour check-in demand, the associated early arrival passenger profiles, acceptable service times associated with the check-in process, passenger check-in profiles along with IATA's optimum passenger wait times by processor type, and acceptable LoS square feet factors which were utilized to evaluate current and future demand.

Future ticketing requirements were based on the following assumptions:

- TVC early passenger arrival profiles derived from the 2020 Passenger Survey were used to determine actual demand at each of the airlines check-in areas.
- Individual airlines peak hours (factoring in the early arrival profiles) were calculated from each of the Design Day Flight Schedules (DDFS).
- A system wide load factor of 88% was utilized.
- Mode of check-in based on 2020 Passenger Survey:
 - o Allegiant = 88% online (55% have a bag(s) to check), 12% Agent
 - o American/Jetblue = 65% online (32% have bag(s) to check), 12% Self-Service Device (SSD) in the queue, 23% Agent
 - o Delta = 66% online (30% have bag(s) to check), 9% SSD at the counter, 25% Agent
 - o United = 63% online (35% have bag(s) to check), 13% SSD at the counter, 24% Agent
 - o New Airlines & Elite (Utilized "Average" of Airlines results) = 69% online (36% have bag(s) to check), 10% SSD at the counter, 21% Agent
- Check-in transaction times:
 - o Agent (with/without bags avg.) = 174 seconds
 - o Dedicated Bag Drop (Agent counter) = 108 seconds
 - o SSD (with/without bags avg.) = 108 seconds
- Max queue wait times based on IATA:
 - o Agent = ten minutes
 - o Dedicated Bag Drop (Agent counter) = five minutes
 - o SSD (with bag) = five minutes
 - o SSD (without bag) = two minutes

- Queue depth = 25ft which includes a 10 foot "active check-in zone" depth in front of the counters for passenger processing and cross-circulation. Current queue depth is approximately 22 ft.
- All current airlines continue to be allocated on their existing lease agreement terms with future airlines allocated to any vacant positions.
- Agent positions based on seven LF counter (two positions per counter) + 30" bag scale per agent = twelve LF counter or six linear feet per agent. Existing agent positions are approximately 4.7ft per agent (includes shared bag scales per agent and counter breaks).
- Counter depth = ten ft (from face of counter to back wall). Existing approximately eleven ft.
- Airline ticket office (ATO) space is a function of the total linear counter length multiplied a 30 ft office depth. Existing averages 20 ft. Typical high-level planning ranges between 25-30 ft in depth but is ultimately a function of airline need.

TSA Checked Baggage Screening

Future checked bag screening assumptions were based on information obtained in the TSA "Systems Optimization & Support CTX5500 Recapitalization Effort + Addendum #1" report.

Additional factors and assumptions included:

- The existing Checked Bag Inspection System (CBIS) includes area for a third future Explosive Detection System (EDS).
- EDS baggage screening based on future CT-80DR machines with rates of 180 bph.
- Checked bag per passenger ratio of approximately 0.6 bpp (2020 Passenger Survey).
- Calculations were based on the TSA's formula for projecting peak ten-minute bag demand and subsequent number of EDS machines derived from the DDFS.
- Area requirements based on an existing ratio of 1,730 sf per EDS unit.

Outbound Baggage Make-up

Future baggage make-up which includes the area used for the accumulation, storage, and make-up of outbound baggage from the ticket counter consists of the make up units, baggage train circulation and maneuvering lanes, and the tug/cart staging areas. Requirements are calculated based on the number of total carts required to be staged adjacent to the makeup devices during the peak departure period and the area associated with those carts expressed as a square foot per cart.

Additional factors and assumptions included:

- Baggage cart requirements are based on a 90-minute staging period prior to a flight's scheduled departure time.
- 50 aircraft seats per baggage makeup cart.
- Approximately 520 sf per cart on average (based on two slope bed carousels with ten ft bypass lanes)
- Additional 25% for baggage train circulation

Baggage Claim Hall

The Baggage Claim Hall represents the area occupied by the baggage claim devices and the retrieval area for active claiming. Baggage claim requirements are primarily based on the percentage of deplaned terminating passengers in a peak 20-minute period within the peak hour, the percentage of those passengers checking bags, travel party size, and to a lesser extent the number of bags checked. Typically, there are two methods to calculate claim capacity, by passenger or baggage accumulation. Since most domestic passengers arrive at the claim device before their baggage, they will typically claim their bag on the first revolution of the device. This results in providing adequate linear claim frontage to accommodate the concentration of these peak passengers and their potential visitors. A typical industry planning standard is to assume all passengers will have no more than one person in front of them to be able to reach in/around to the claim device when the passenger’s baggage is presented. This results in an IATA LoS C planning ratio of 1.5-LF per claiming passenger.

Additional factors and assumptions included:

- Assumed current Common Use claim device assignment
- 88% Load Factor, 100% terminating passengers, with 59% of those claiming bags (2020 Passenger Survey)
- A peak 20-minute factor of 91% derived from the DDFS
- 25 sf per linear feet of flat plate claim (includes device, retrieval area, and circulation within the positive claim area). Typical ranges for flat plate = 25-30 sf with an existing of approximately 23 sf

Passenger Security Screening Checkpoint

TSA demand calculations were based on a typical planning standard which utilizes the common use peak 30 minutes of the departing peak hour. Future planning requirements were based on the TSA Checkpoint Requirements and Planning Guide (CRPG) published May 2020.

Additional requirements are based on the following planning guidelines and communication with local TSA:

- A peak 30-minute demand of approximately 34% of the peak hour was calculated from the design day flight schedules
- 2020 Passenger Survey split of approximately 45% PreCheck versus 55% standard passengers
- Local TSA provided average throughput of 225 and 153 passengers per lane per hour for PreCheck and standard passengers respectively
- An additional 10% of the daily enplanement activity was added for employee and crew screening.
- To calculate lane requirements an industry acceptable maximum waiting time of ten minutes in the queue was assumed
- TSA queue requirement of 600 sf per lane (twelve sf per passenger)
- TSA requirement of two Travel Document Checkers (TDC) per screening lane
- Equipment spacing based on future CT-X-ray baggage screening technology

Passenger Holdrooms

Holdrooms are based on the required mix of aircraft gates and the average seating capacity of each aircraft design group. These areas generally consist of the passenger seating area, the airlines podium and associated queue space, the loading bridge egress corridor, circulation and standing areas, and any additional square footage allowances for areas such as soft-seating or charging stations.

Additional factors and assumptions include the following:

- An 88% load factor.
- An IATA LoS C with 70% of the passengers seated at 18 sf per passenger and the other 30% standing at 13 sf was also utilized.
- A 10% IATA seat inefficiency factor (passengers seating every other seat)
- A holdroom depth of 35 feet allows for holdrooms to provide soft seating areas and a deeper queue area at the gate podiums.
- Whenever possible holdrooms are suggested to be configured in “shared” or “paired” layouts in order to take advantage of the adjacent holdroom’s seating area. However, this is only achievable when no near simultaneous departures occur at the adjacent holdroom which is very dependent on airline scheduling patterns. For this analysis a 10% reduction factor for gates in a “paired” layout was utilized.

APPENDIX

Concession Space

The concessions areas are devoted to commercial spaces that generate revenue for the airport including food/ beverage, news/gift/sundry, rental car, and other revenue generating functions.

There are two general high level planning rules to approximate overall concessions areas; one suggesting approximately eight to 12% of the public serving space be allocated to concessions, another utilizing a ratio of square feet of total revenue generating concessions space per 1,000 annual enplanements. These areas typically include any space which the public has unrestricted access to. Of this area it is recommended that 80-90% of the total concessions area be allocated to the post security or airside portion the terminal. The remaining 10-20% is allocated to the non-secure or landside portion of the terminal but is also dependent on airport size. Due to the financial importance of the concession program, it is suggested that the Airport seek a concession planning specialist prior to determining a final airside/landside split.

Additional factors and assumptions include the following:

- 9 sf per 1,000 enplaned passenger (8-10 sf high level planning factor)
- 70% airside, 30% landside
- 30% additional for support spaces (25-35% typical range)
- Rental Car areas based on existing 460 sf/Office (4 offices) and 8 ft deep queue

Airport Operations (Maintenance, Janitorial, Storage, Shops)

These areas account for the building maintenance facilities and consists of shops, storage, office space, circulation, and janitorial closets. Typical planning standards utilize a factor of 1-2% of the total functional areas. For this analysis, a ratio of 1% was utilized.

Mechanical, Electrical, Plumbing, Communications

This area of the program includes all the utility support spaces for the terminal and is generally a percentage of the enclosed functional areas of the terminal which typically range between 10-15%. A ratio of 10% was used in the analysis.

D: DETAILED SPACE PROGRAM

TVC - Cherry Capital Airport	Existing Terminal Space Full Capacity	2019 Recommended Facilities	2023 Recommended Facilities	2025 Recommended Facilities	2030 Recommended Facilities	2035 Recommended Facilities	Alternative 9
GENERAL STATISTICS							
General ¹							
Overall Airport Statistics							
Annual Passengers	580,744	580,744	690,244	776,864	1,060,506	1,292,136	1,292,136
Annual Enplanements	290,372	290,372	345,122	388,432	530,253	646,068	646,068
Peak Hour Passenger Statistics							
Peak Hour Enplaned	385	385	355	531	722	722	722
Peak Hour Deplaned	267	267	339	427	700	700	700
Total Peak Hour ²	607	607	541	841	1,360	1,360	1,360
Gates/Positions(International)							
Aircraft Gates/Positions							
I Small Regional (Cessna/Metro)	-	-	-	-	-	-	-
II Medium Regional (BE1/CRJ,CR7/ERJ/SF340)	1	5	7	7	4	4	3
III Large Regional (Q400,CR9,E170,175)	2	3	3	3	-	-	-
III Small Narrowbody (A220, B717, E190)	-	-	-	1	2	2	-
III Narrowbody (A320/B737w)	4	3	2	2	8	8	12
Total Gates/Total Passenger Boarding Bridges:	4	11	12	13	14	14	15
Total EQA ² :	5.4	6.5	6.3	7.0	11.0	11.0	14.7
Total NBEG ³ :	6.7	9.5	9.9	10.9	12.8	12.8	15.0
Total Aircraft Positions:	7	11	12	13	14	14	15

¹ Annual Passenger numbers are taken from the Prein & Newhof (P&N) Aviation Demand Forecast

² The Total Peak Clock Hour numbers represent the total enplanement/deplanements peak hour and not the sum of the components as each may occur in separate hours.

² EQA (Equivalent Aircraft) normalizes gate based on seating capacity of accommodated aircraft

³ NBEG (Narrow Body Equivalent Gate): Used to normalize the apron frontage demand and capacity to that of a typical narrowbody aircraft gate

Sources: Prein & Newhof Aviation Forecast

TVC - Cherry Capital Airport		Existing Terminal Space Full Capacity	2019 Recommended Facilities	2023 Recommended Facilities	2025 Recommended Facilities	2030 Recommended Facilities	2035 Recommended Facilities	Alternative 9
PUBLIC SPACE								
Circulation								
Ticket Lobby Circulation	sf	3,728	2,140	2,510	2,510	2,980	2,980	5,597
Baggage Claim Circulation	sf	2,248	900	1,500	1,500	2,100	2,100	3,823
Airside Concourse Circulation (Incl. Fire/Service Stairs to Apron)	sf	3,434	19,570	20,390	22,450	26,370	26,370	48,749
General Public Circulation (Includes Vestibules, Vert Circ, Corridors)	sf	11,857	9,360	10,140	11,170	15,170	15,330	3,979
Subtotal:		21,267	31,970	34,540	37,630	46,620	46,780	62,148
Security Screening Checkpoint (SSCP)								
Number of Lanes	pos	2	2	2	2	3	3	3
Security Screening Area	sf	2,501	4,690	4,690	4,690	6,290	6,290	10,324
Queuing Area	sf	498	1,220	1,220	1,220	1,820	1,820	2,417
TSA Offices	sf	2,907	3,350	3,350	3,350	3,220	3,220	3,281
Subtotal:		5,906	9,260	9,260	9,260	11,330	11,330	16,022
Queuing/Waiting Areas								
Public Seating	sf	1,555	630	610	880	1,260	1,260	1,636
Ticket Lobby/Queue (including any free standing kiosks)	sf	3,556	3,600	4,220	4,220	5,000	5,000	4,633
Baggage Claim Area								
Claim Devices (Flat Plate)	no	2	1	2	2	3	3	3
Linear Frontage Required	lf	200	94	180	234	388	388	386
Baggage Claim Hall (Includes Device, Queues & Circulation w/in Positive Claim area)	sf	4,616	2,500	5,000	6,000	9,750	9,750	9,634
Domestic Meeter/Greeter Lobby	sf	803	320	410	520	850	850	866
Subtotal:		10,530	7,050	10,240	11,620	16,860	16,860	16,769
Gate Holdrooms								
Gates								
Small Regional (Cessna/Metro)	sf	-	-	-	-	-	-	-
Medium Regional (BE1/CRJ,CR7/ERJ/SF340)	sf	-	5,440	7,620	7,620	4,350	4,350	4,400
Large Regional (Q400/CR9,E170/75/90)	sf	-	4,890	4,890	4,890	-	-	-
Small Narrowbody (A220, B717)	sf	-	-	-	2,110	4,210	4,210	-
Narrowbody (A320/B737w)	sf	-	8,010	5,340	5,340	21,360	21,360	25,166
Subtotal:		7,911	18,340	17,850	19,960	29,920	29,920	29,566
Restrooms								
Restrooms - Airside (post-Security)	sf	1,300	2,080	2,310	2,780	5,090	5,090	5,944
Restrooms - Landside (pre-Security)	sf	1,481	1,840	1,840	2,310	2,550	2,550	1,792
Subtotal:		2,781	3,920	4,150	5,090	7,640	7,640	7,736
Other Space								
Misc Tenant								
Business Center	sf	202	200	200	200	200	200	200
Mail	sf	117	110	110	110	110	110	120
SARA (Airside)	sf	-	140	140	140	290	290	300
Valet/Coat Check	sf	-	-	-	-	-	-	911
Children's Play Area/Flyers Club	sf	-	-	-	-	-	-	2,450
Art/Lounge	sf	-	-	-	-	-	-	0
Other (Displays, Information Counters, etc)	sf	684	680	680	680	680	680	4,029
Subtotal:		1,003	1,130	1,130	1,130	1,280	1,280	8,010

TVC - Cherry Capital Airport		Existing Terminal Space Full Capacity	2019 Recommended Facilities	2023 Recommended Facilities	2025 Recommended Facilities	2030 Recommended Facilities	2035 Recommended Facilities	Alternative 9
AIRLINE SPACE								
Domestic Airline Space		Units						
Ticket Counter								
Linear Counter Check-in Positions (Kiosk)	pos	30 (6)	23(6)	27(8)	27(8)	32(8)	32(8)	36
Total Check-in Positions (Kiosk)	pos	32 (8)	25(8)	29(10)	29(10)	34(10)	34(10)	
Total Linear Position Length	lf	159	143	168	168	199	199	222
Counter Area (Includes any curb check)								
	sf	1,722	1,430	1,680	1,680	1,990	1,990	2,214
Airline Ticket Offices (ATO)	sf	5,148	4,280	5,030	5,030	5,960	5,960	5,951
Baggage Service Offices (BSO)	sf	686	300	300	300	600	600	136
Subtotal:		7,556	6,010	7,010	7,010	8,550	8,550	8,301
Other Airline Space								
Outbound Bag Make-Up ¹	sf	3,893	6,220	6,220	10,170	9,400	9,400	19,592
Checked Baggage Screening (TSA Space) ¹	sf	5,192	3,460	3,460	3,460	5,190	5,190	5,489
Level 1 Inspection Units	no	2	2	2	2	3	3	3
Airside Operations/Storage (IT,Offices,etc.)	sf	658	810	790	880	1,380	1,380	450
Inbound Baggage Claim Laydown (secure) ¹	sf	2,333	1,400	2,800	5,600	8,400	8,400	2,701
Inbound/Outbound Baggage Circulation	sf	2,665	1,900	2,250	3,940	4,450	4,450	3,443
Other Airline Offices/Systems & Support, Misc	sf	-	120	120	130	210	210	450
Subtotal:		14,741	13,910	15,640	24,180	29,030	29,030	32,125
CONCESSIONS SPACE								
Landside Concessions (pre-Security)		Units						
Rental Car								
Number of Counters	pos	4	4	4	4	4	4	4
Counter Area/Offices	sf	1,841	1,840	1,840	1,840	1,840	1,840	1,499
Queue	sf	400	510	510	510	510	510	698
Landside Concessions	sf	1,128	780	930	1,050	1,430	1,740	1,009
Support/Storage (Prep Areas,Offices, etc)	sf	324	240	280	310	430	520	321
Subtotal:		3,693	3,370	3,560	3,710	4,210	4,610	3,527
Airside Concessions (post Security)								
Airside Concessions	sf	2,734	1,830	2,170	2,450	3,340	4,070	4,939
Support/Storage (Prep Areas,Offices, etc)	sf	365	550	650	730	1,000	1,220	2,028
Subtotal:		3,099	2,380	2,820	3,180	4,340	5,290	6,967

TVC - Cherry Capital Airport		Existing Terminal Space Full Capacity	2019 Recommended Facilities	2023 Recommended Facilities	2025 Recommended Facilities	2030 Recommended Facilities	2035 Recommended Facilities	Alternative 9
NON-PUBLIC SPACE								
Non-Airline Tenant Space		Units						
Airport Administration	sf	5,446	5,440	5,440	5,440	5,440	5,440	5,446
Offices/Support/Storage	sf	136	130	130	130	130	130	136
Airport Police (Includes Locker Facilities)								
Subtotal:		5,582	5,570	5,570	5,570	5,570	5,570	5,582
Restrooms/Circulation								
Non-Public Restrooms	sf	692	690	740	960	1,090	1,100	242
Non-Public Circulation (Includes Vertical Circ)	sf	2,691	2,760	2,970	3,830	4,380	4,410	1,495
Subtotal:		3,383	3,450	3,710	4,790	5,470	5,510	1,737
Building Systems & Support								
Loading Docks	sf	1,106	170	210	230	320	390	1,004
# of Bays	#	2	1	1	1	1	1	1
Airport Operations (Maintenance,Janitorial,Storage,Shops)	sf	713	1,060	1,200	1,330	1,710	1,720	3,689
Mechanical/Electrical/Plumbing(MEP)/Communications/IT	sf	12,860	10,640	11,550	13,310	17,080	17,240	4,635
Building Structure/Non-net/Void	sf	6,777	5,910	6,420	7,400	9,500	9,590	10,391
Exterior - (Public Gardens) ³	sf	3,264	3,260	3,260	3,260	3,260	3,260	1,180
Subtotal:		21,456	17,780	19,380	22,270	28,610	28,940	19,719

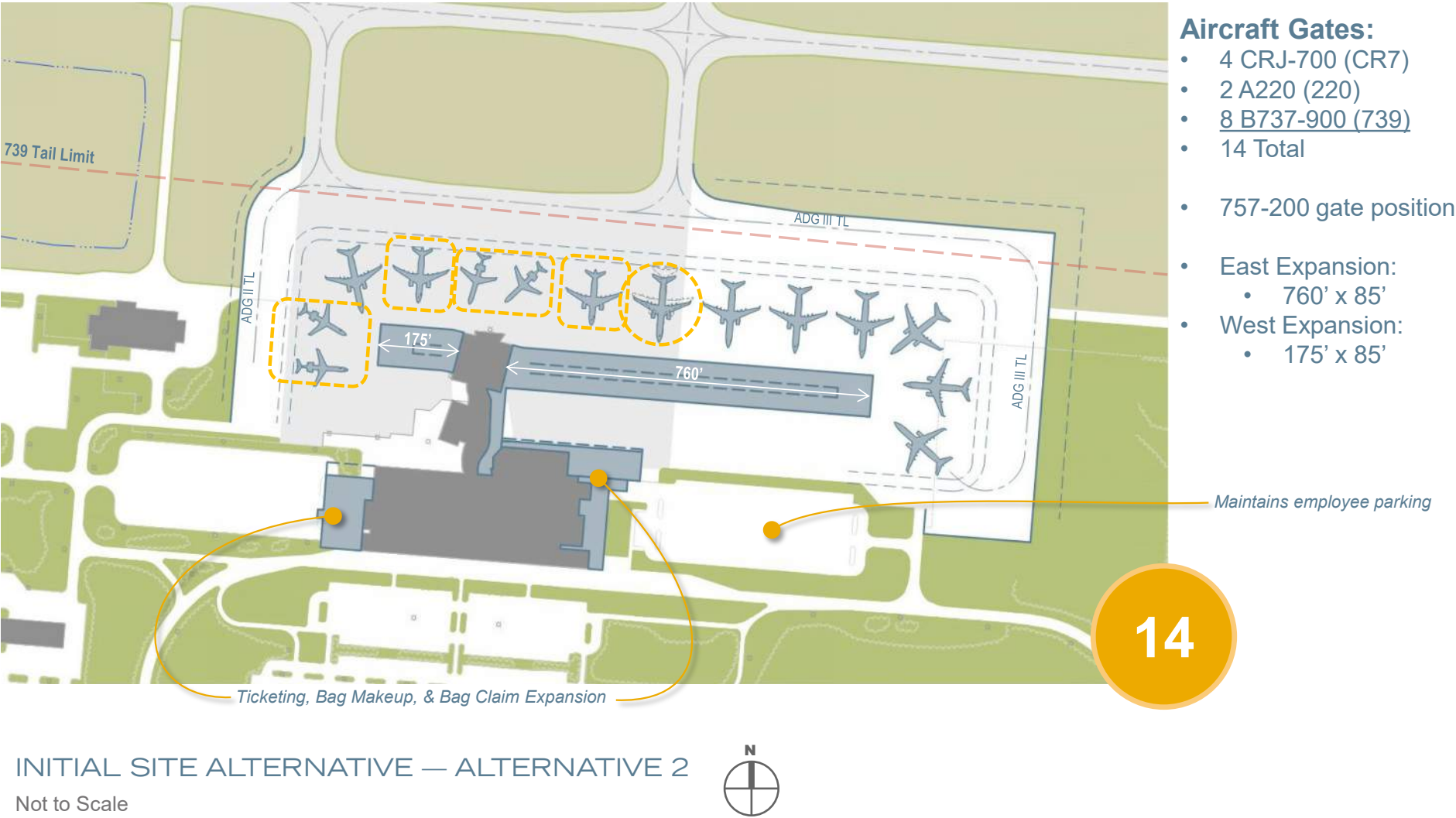
TVC - Cherry Capital Airport		Existing Terminal Space Full Capacity	2019 Recommended Facilities	2023 Recommended Facilities	2025 Recommended Facilities	2030 Recommended Facilities	2035 Recommended Facilities	Alternative 9	
SUMMARY									
2019 - 2035	General								
	Annual Enplanements		290,372	290,372	345,122	388,432	530,253	646,068	646,068
	Annual O&D Enplanements (%)		290,372 (100.%)	290,372 (100.%)	345,122 (100.%)	388,432 (100.%)	530,253 (100.%)	646,068 (100.%)	646,068 (100.%)
	Peak Hour Enplaned Domestic		385	385	355	531	722	722	722
	Peak Hour Deplaned Domestic		267	267	339	427	700	700	700
	Gates/Contact Aircraft Positions		4	11	12	13	14	14	15
Public Space									
	Circulation (Ticketing,Baggage Claim,Seating,General Circ,Airside Post Security)	sf	21,267	31,970	34,540	37,630	46,620	46,780	62,148
	TSA Security Screening Area (queue, screening, offices)	sf	5,906	9,260	9,260	9,260	11,330	11,330	16,022
	Queuing/Waiting Areas (Public Seating, Ticket Lobby, Baggage Claim Hall, Meeter/Greeter)	sf	10,530	7,050	10,240	11,620	16,860	16,860	16,769
	Gate Holdrooms	sf	7,911	18,340	17,850	19,960	29,920	29,920	29,566
	Restrooms (Pre/Post Security)	sf	2,781	3,920	4,150	5,090	7,640	7,640	7,736
	Other Space/Amenity (Misc Tenant, Displays, Information counters, etc.)	sf	1,003	1,130	1,130	1,130	1,280	1,280	8,010
	Subtotal:		49,398	71,670	77,170	84,690	113,650	113,810	140,251
Airline Space									
	Units								
	Domestic Airline Space (Queue, Counter, ATO, BSO)	sf	7,556	6,010	7,010	7,010	8,550	8,550	8,301
	Other Airline Space (Bag Makeup, Laydown, Bag Screening, Airside Ops/Offices, Misc)	sf	14,741	13,910	15,640	24,180	29,030	29,030	32,125
	Subtotal:		22,297	19,920	22,650	31,190	37,580	37,580	40,426
Concessions									
	Landside Concessions (pre-Security)	sf	3,693	3,370	3,560	3,710	4,210	4,610	3,527
	Airside Concessions (post-Security)	sf	3,099	2,380	2,820	3,180	4,340	5,290	6,967
	Subtotal:		6,792	5,750	6,380	6,890	8,550	9,900	10,494
Non-Public Space									
	Non-Airline Tenant Space (Airport Admin/Support, Storage, Misc. Tenants)	sf	5,582	5,570	5,570	5,570	5,570	5,570	5,582
	Restrooms/Circulation	sf	3,383	3,450	3,710	4,790	5,470	5,510	1,737
	Airport Operations (Maintenance,Janitorial,Storage,Shops)	sf	713	1,060	1,200	1,330	1,710	1,720	3,689
	Building Systems & Support (MEP,Communications/IT,Loading Docks,Structure)	sf	20,743	16,720	18,180	20,940	26,900	27,220	16,030
	Subtotal:		30,421	26,800	28,660	32,630	39,650	40,020	27,038
Total									
Total Functional & Support Terminal Area:		102,131	118,230	128,440	148,000	189,930	191,720	218,210	
Total Gross Terminal Area:		108,908 ²	124,140	134,860	155,400	199,430	201,310	218,210	

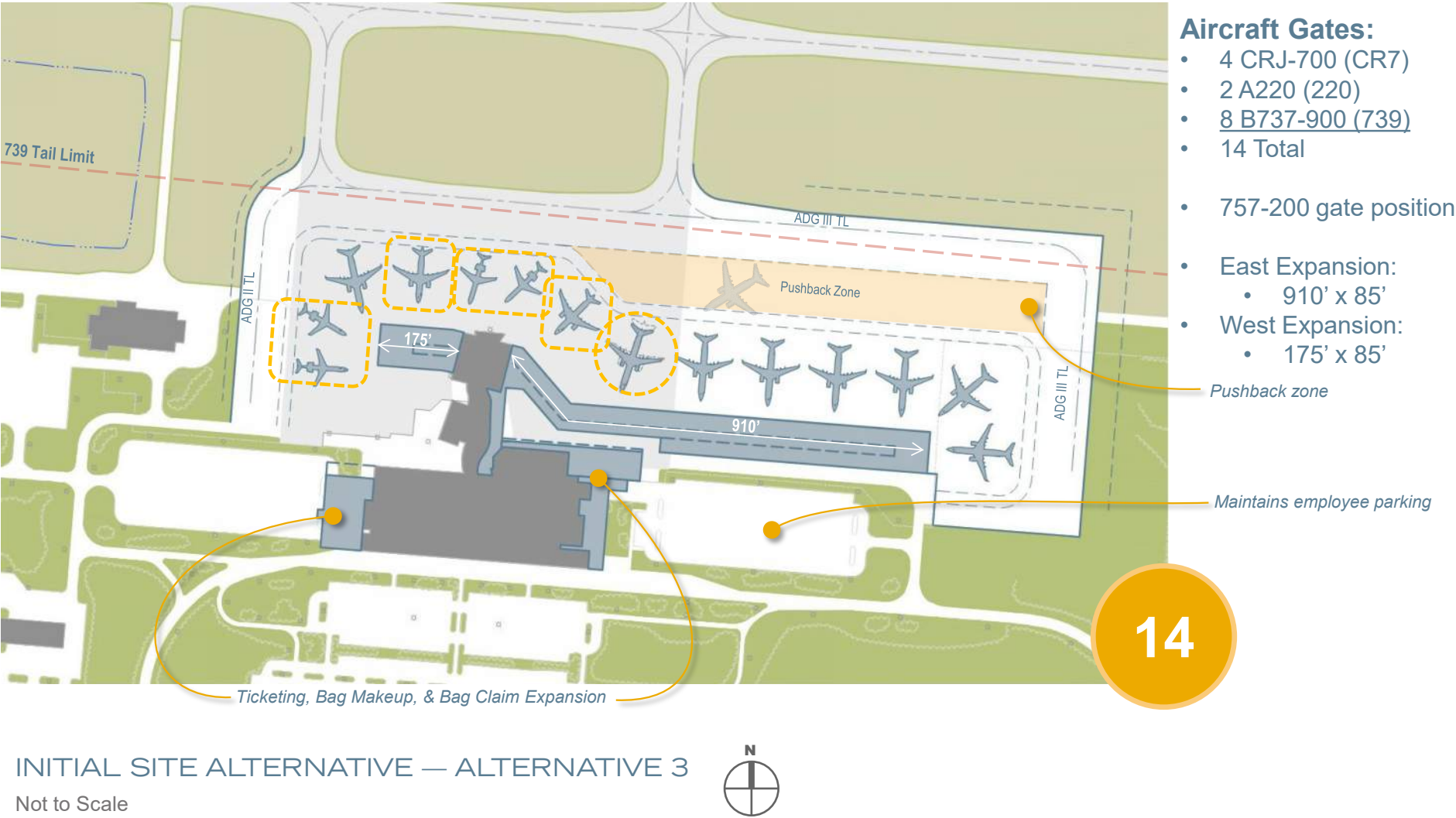
¹Areas based on common use
²Represents the total available functional and gross terminal square footage (leased, non-leased, airport owned, and any vacant areas) and totals may not sum due to rounding
³Not included in the subtotal
Sources: Prein & Newhof Aviation Forecast & Alliance Analysis

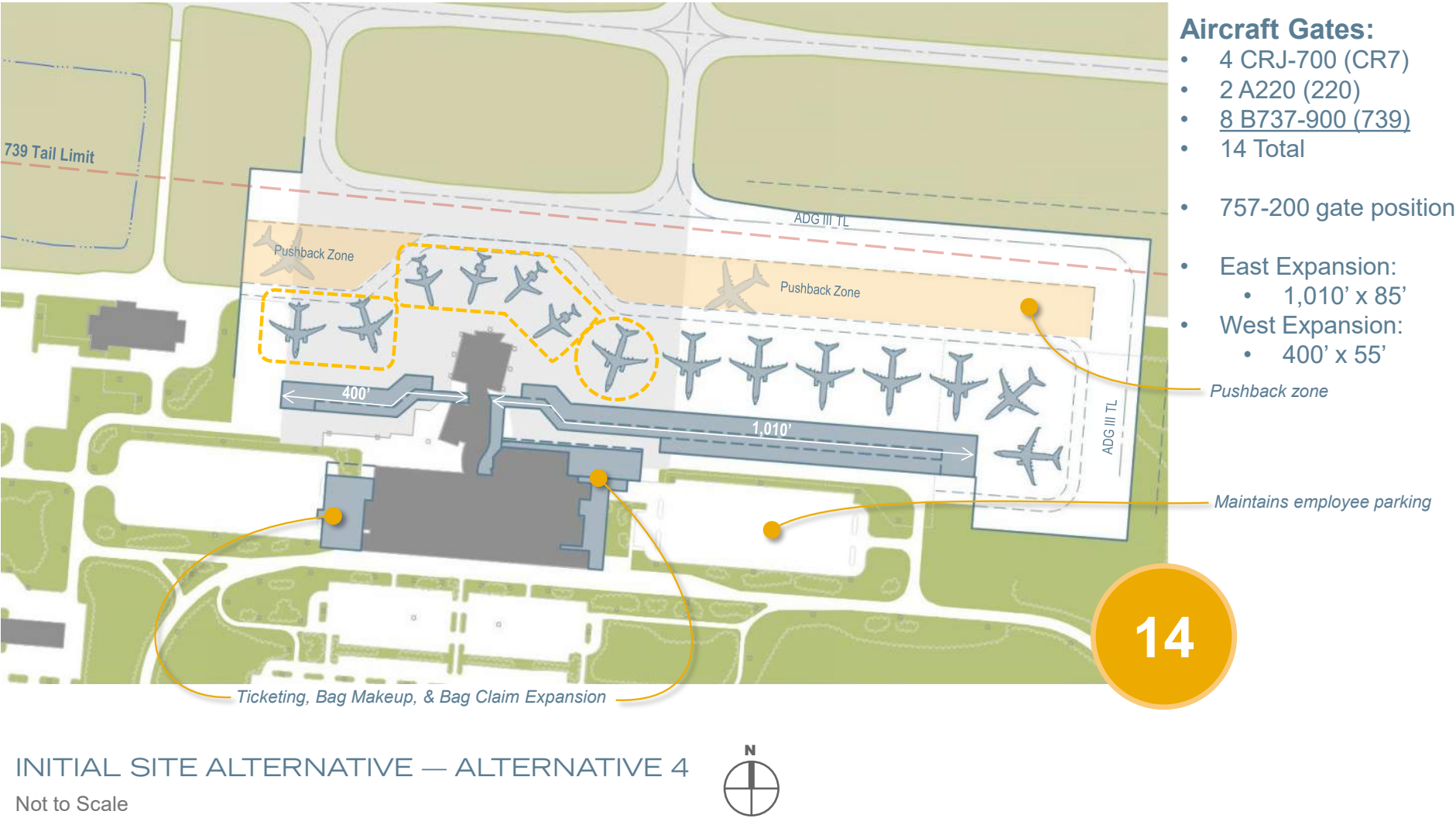
E: SITE CONFIGURATION — INITIAL ALTERNATIVES

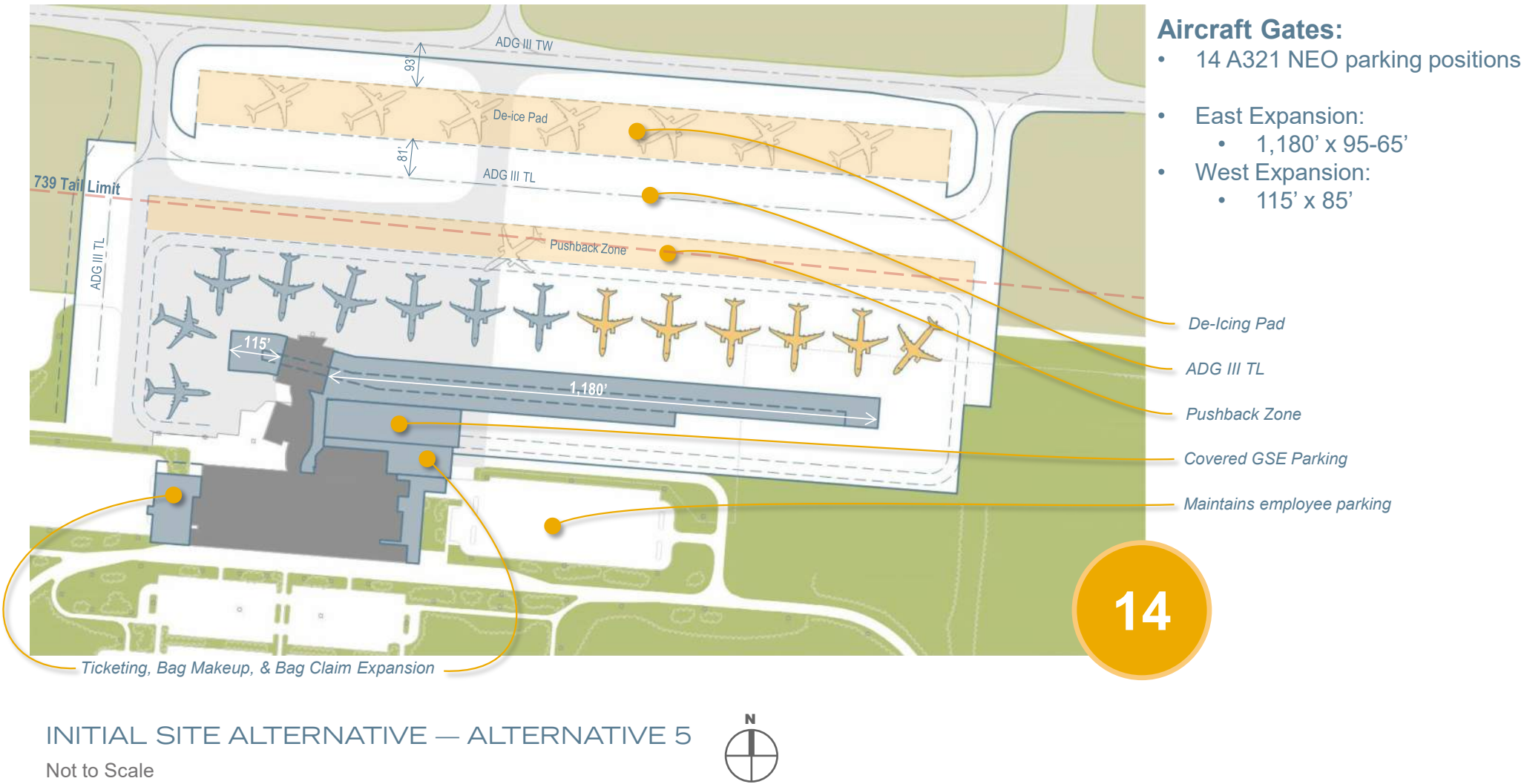
At right and on the following pages are the variety of initial site layout alternatives developed during the course of this study. Alternative 9 was selected by airport leadership as the preferred alternative as described in Section 04 — Preferred Alternative.

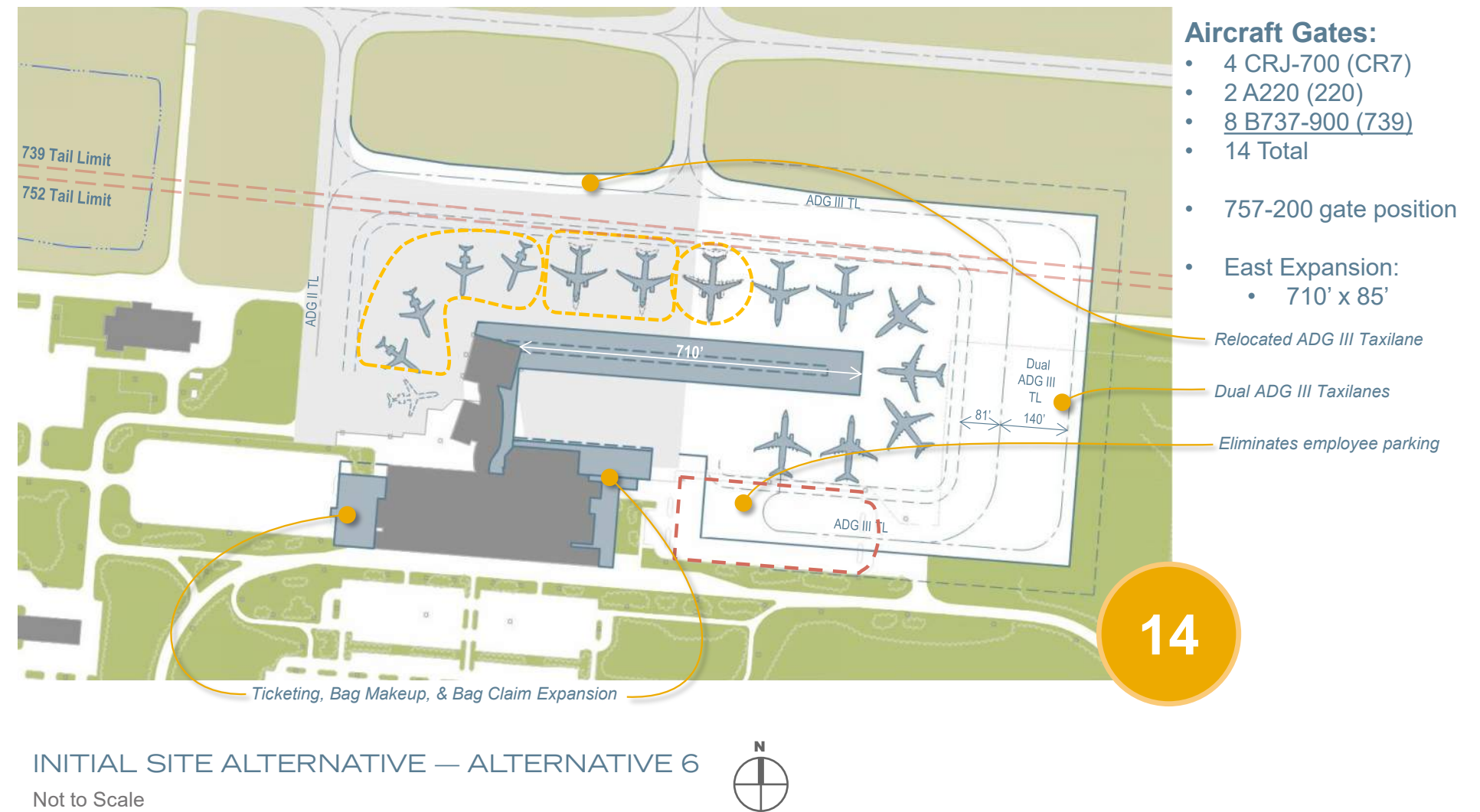


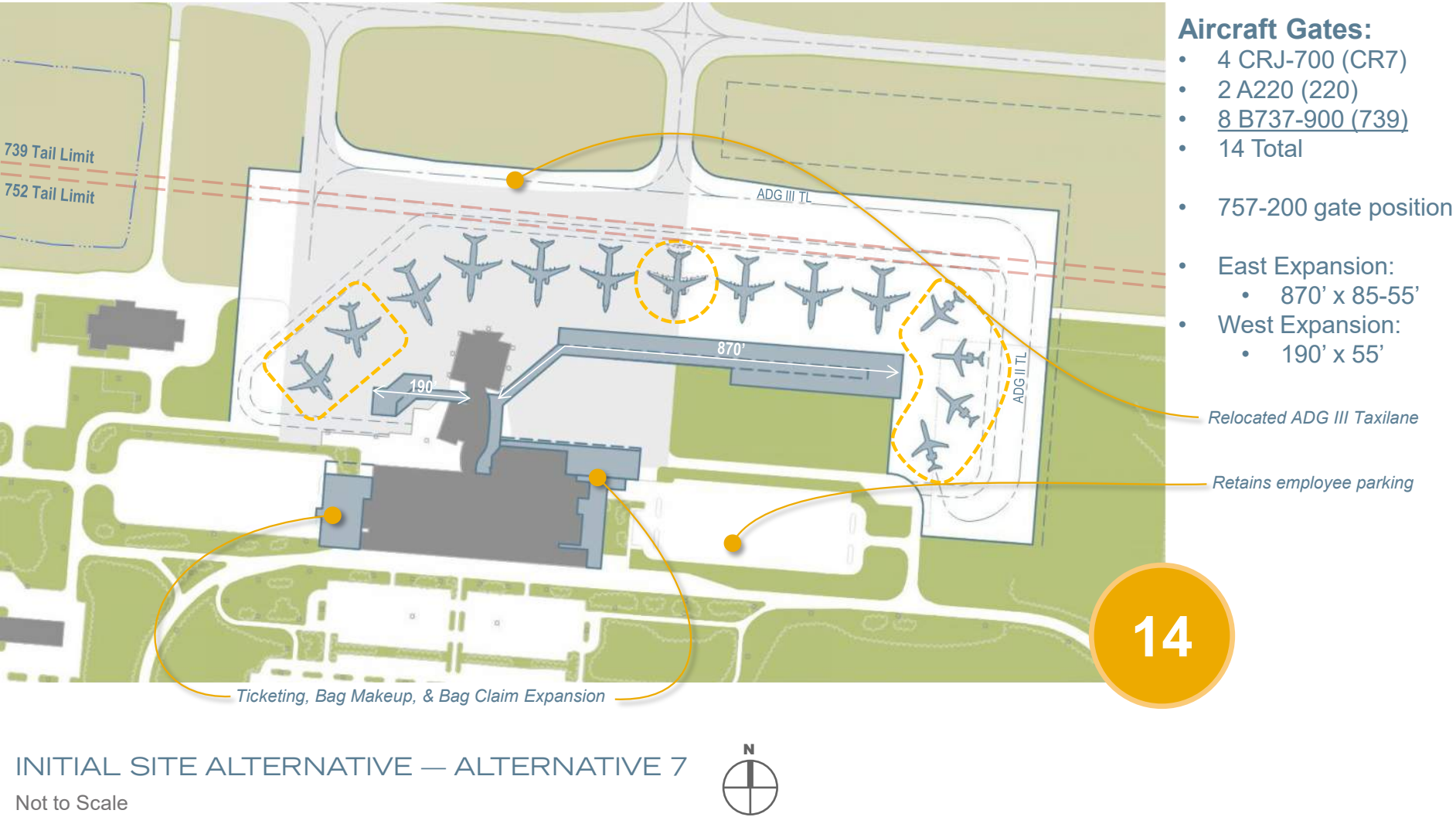


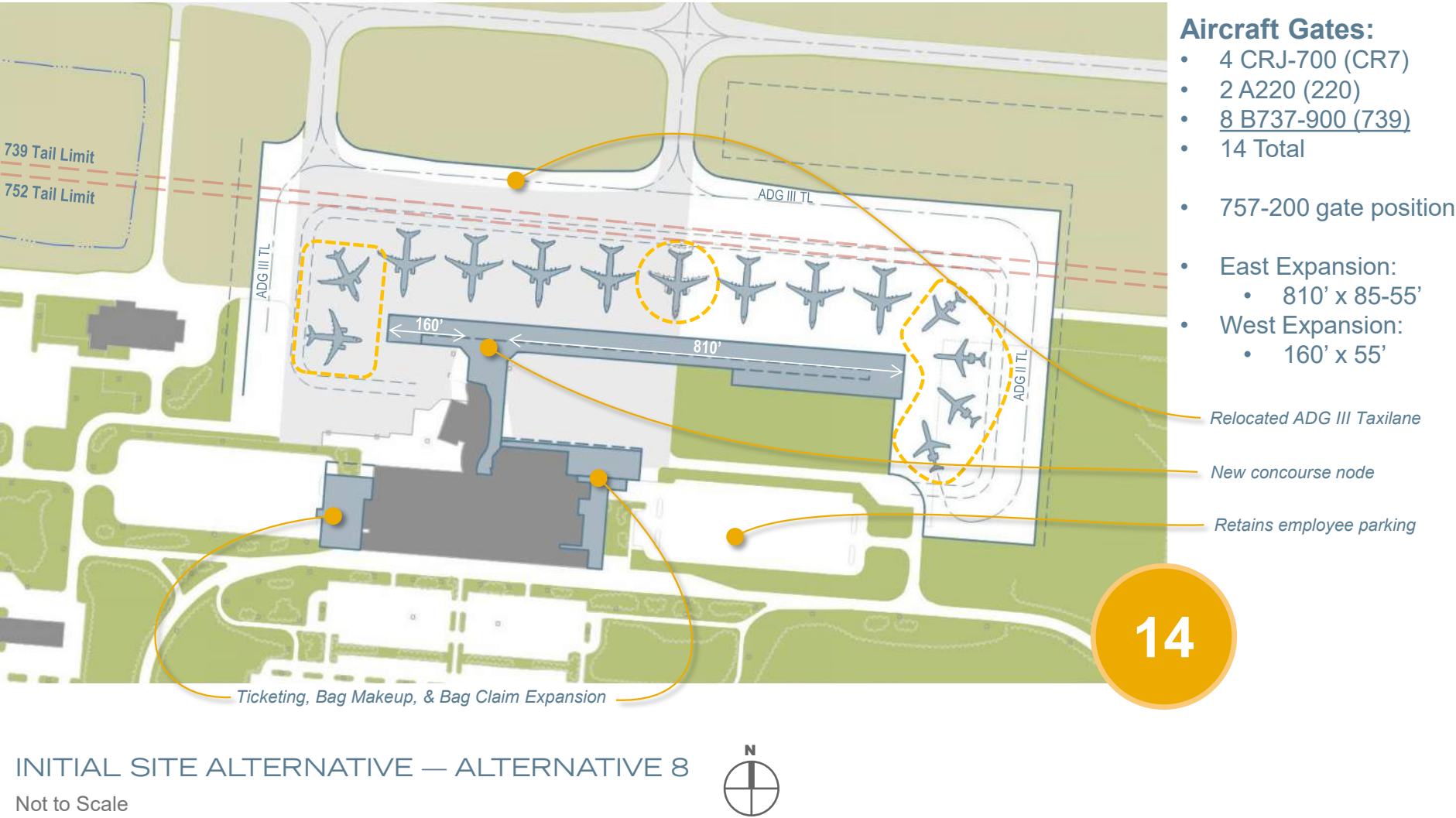


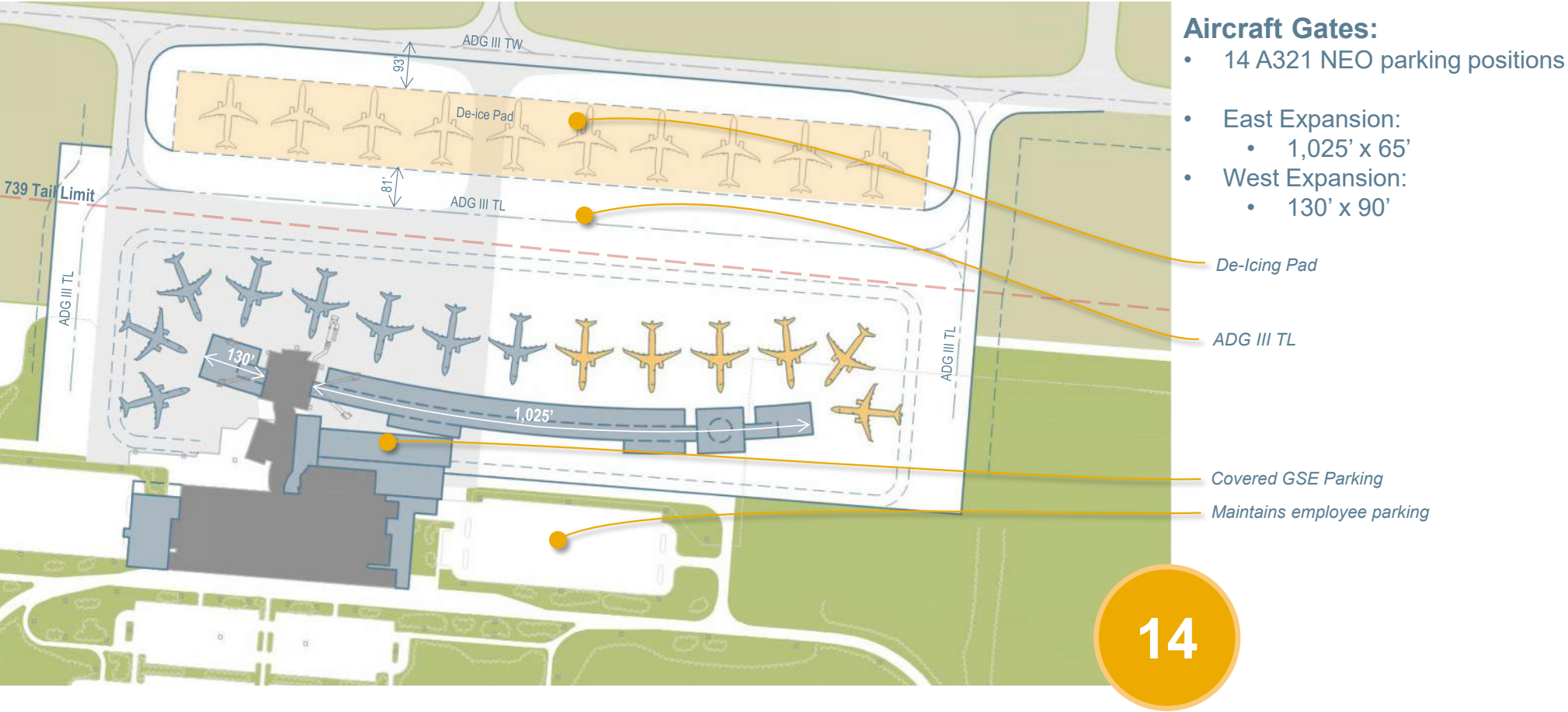










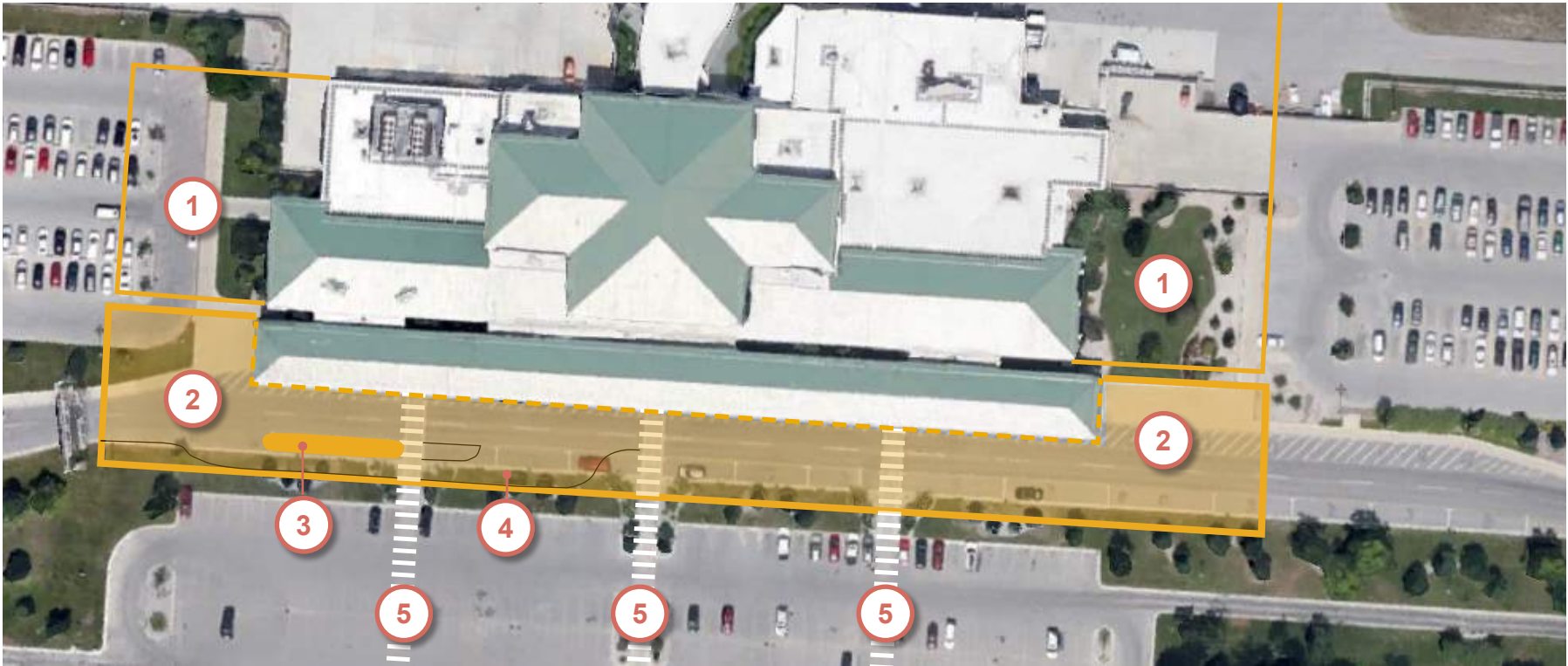


INITIAL SITE ALTERNATIVE — ALTERNATIVE 10

Not to Scale

F: SITE CONFIGURATION — CURBSIDE

TVC leadership has expressed the desire for the new design to incorporate an extension of the footprint of the curbside canopy. Today's canopy arrangement has challenges as described on pg. 9. As shown at right, the proposed canopy extends alongside the front facades of the expanded areas of the terminal to the east and west. Additionally, the canopy footprint will extend farther south to cover the pick-up/drop-off lane plus the drive aisles. A new dedicated bus loading island could allow safe boarding near to but separate from the primary passenger loading/unloading curb for personal vehicles. The actual design and configuration of the curbside loading, parking, and driving areas including wayfinding implementation will require further study during design phases.



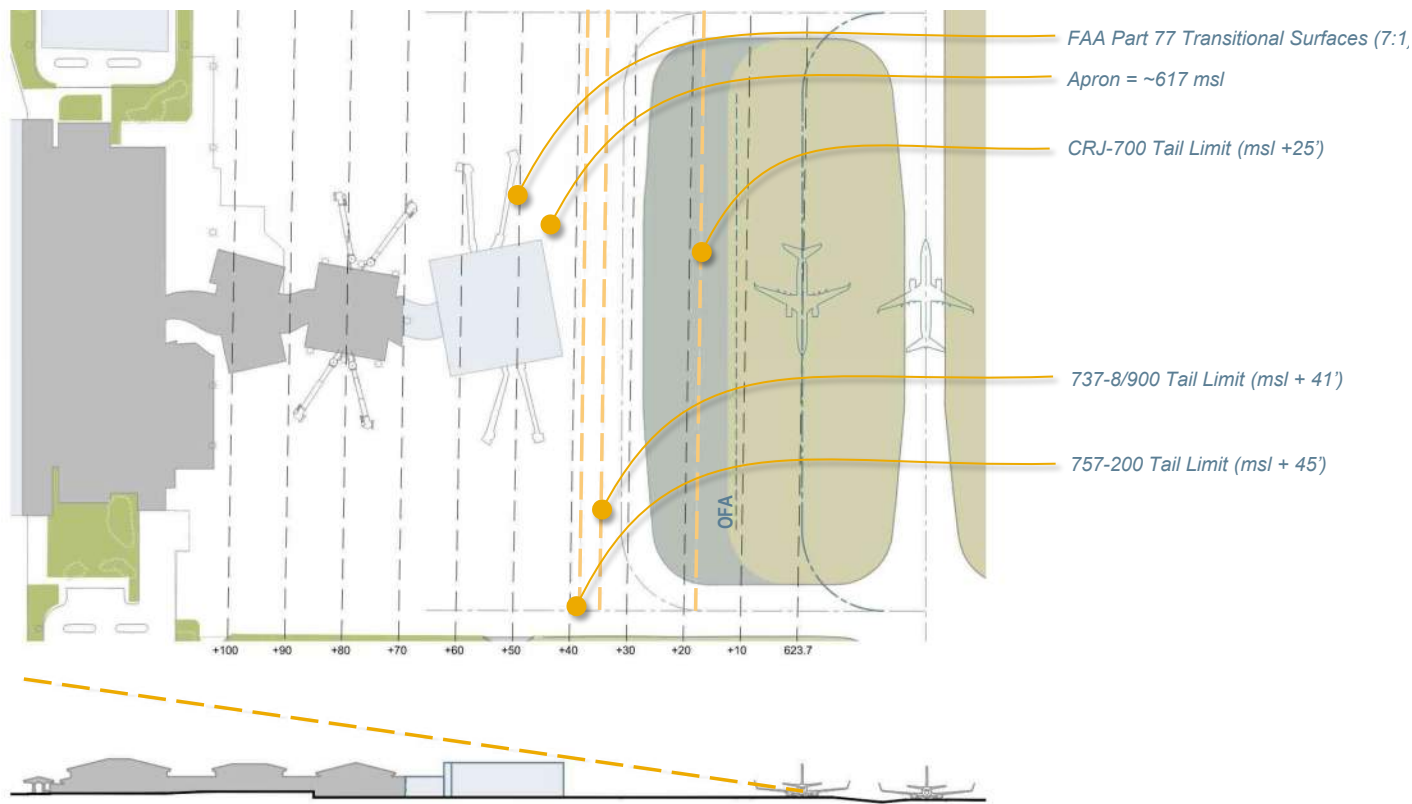
SITE CONFIGURATION: CURBSIDE

Not to Scale

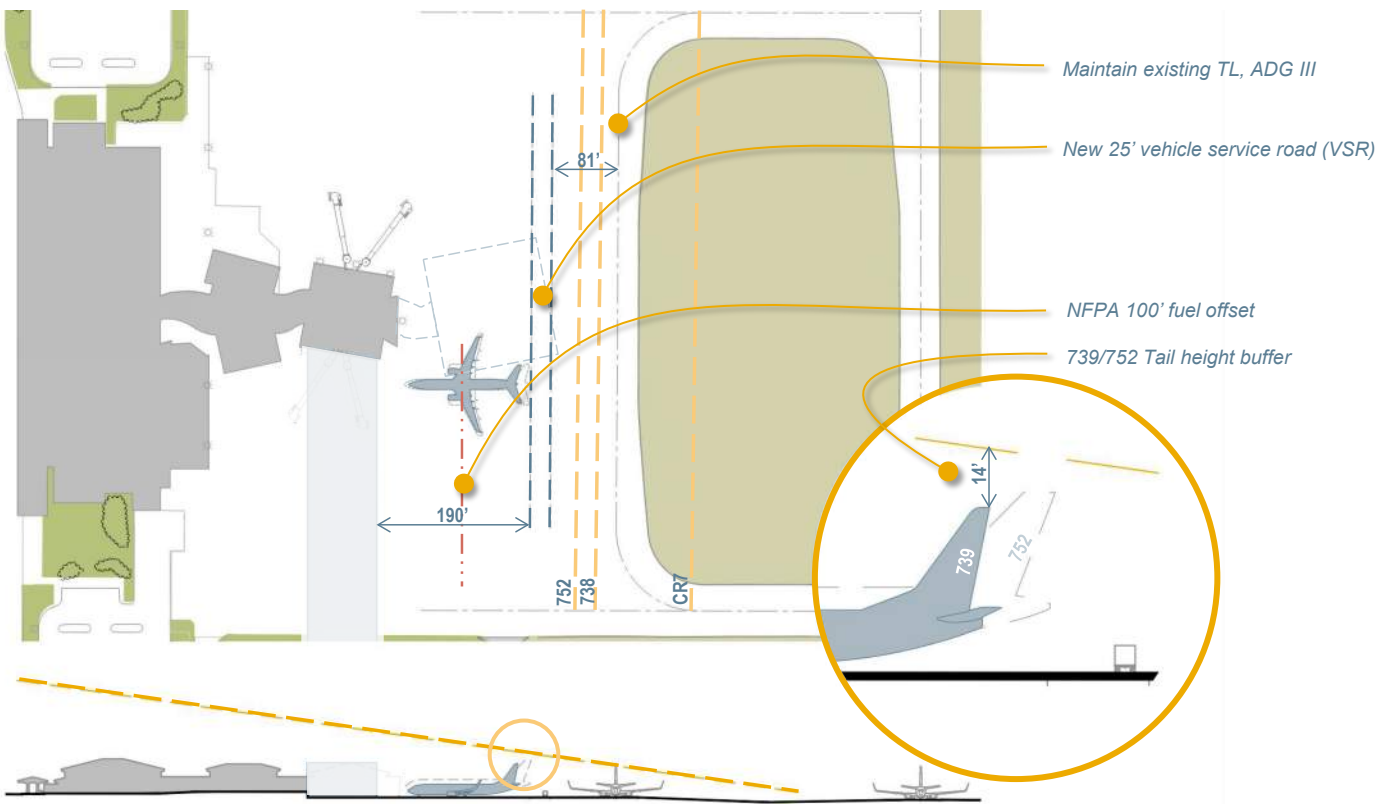
DIAGRAM KEY NOTES

- 1. Terminal building expansion
- 2. Curbside canopy extension over pick-up/drop-off lane and drive aisles
- 3. Bus shelter island
- 4. Bus loading/unloading lane
- 5. Maintain existing pedestrian routes to terminal

G: SITE CONFIGURATION — PART 77 ANALYSIS



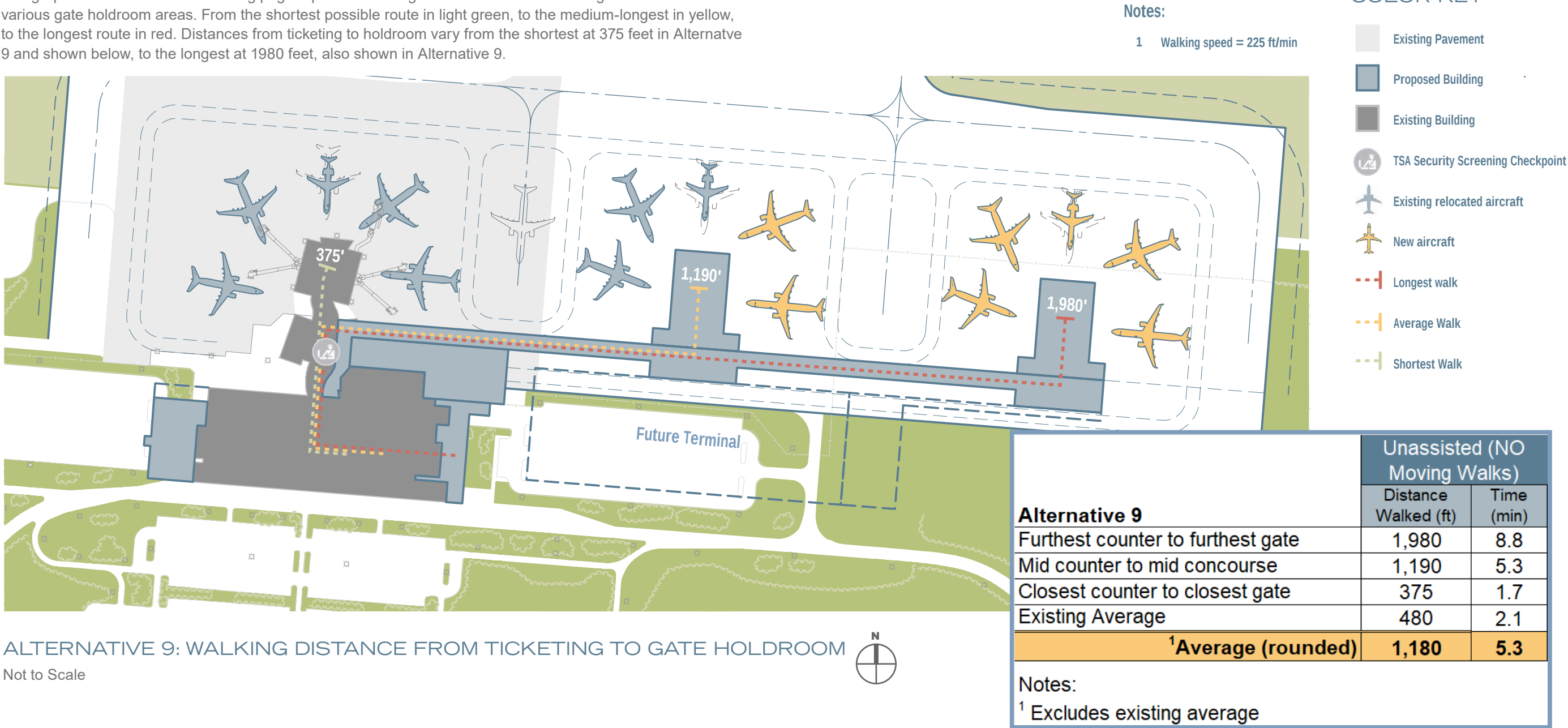
PART 77 ANALYSIS — PREVIOUS MASTER PLAN
Not to Scale



PART 77 ANALYSIS — PROPOSED SITE CONFIGURATION
Not to Scale

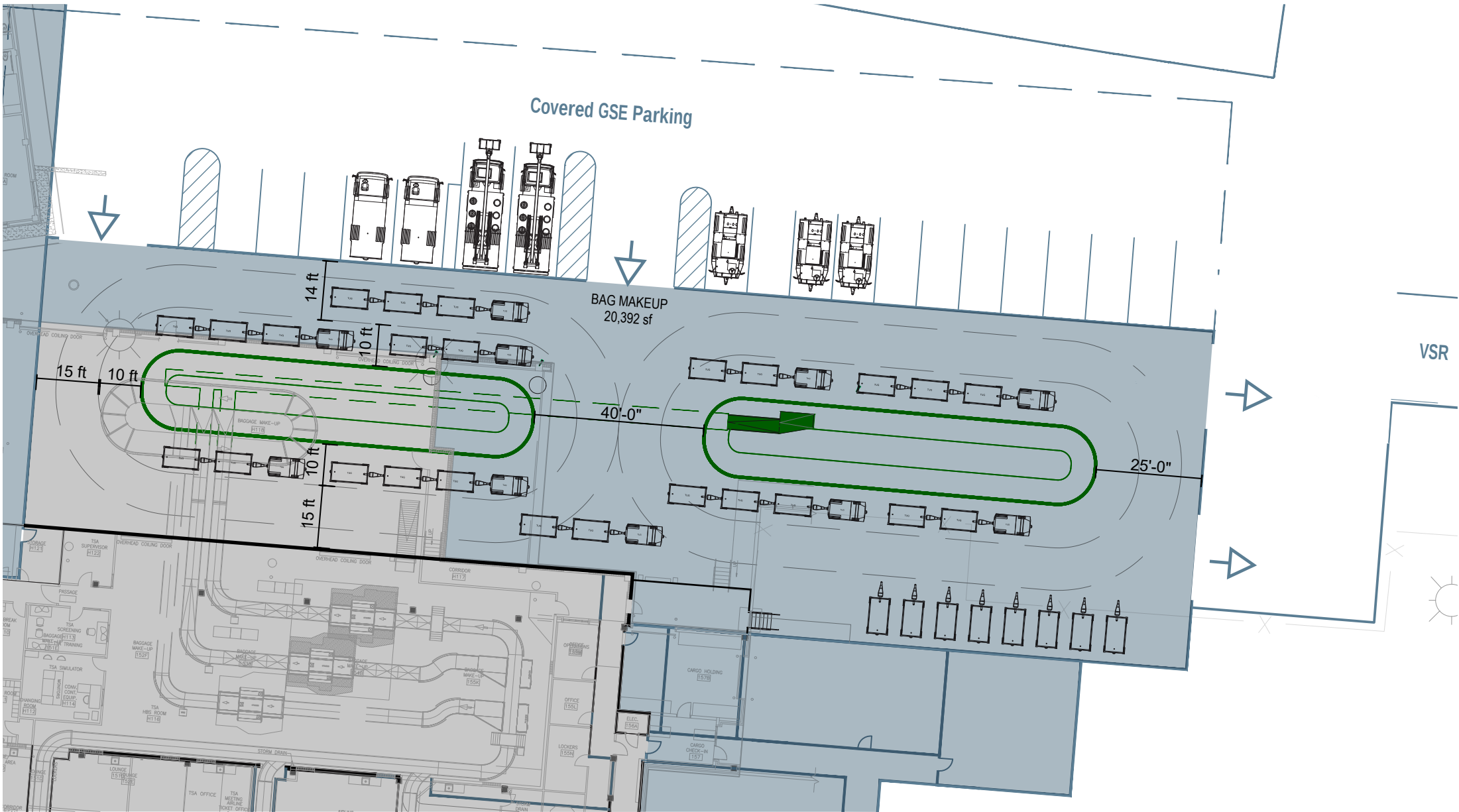
H: SITE CONFIGURATION AND WALKING DISTANCES

The graphics on this and the following page represent walking distances from the ticketing counters to the various gate holdroom areas. From the shortest possible route in light green, to the medium-longest in yellow, to the longest route in red. Distances from ticketing to holdroom vary from the shortest at 375 feet in Alternative 9 and shown below, to the longest at 1980 feet, also shown in Alternative 9.



I: BAGGAGE MAKEUP AREA / TUG TRAFFIC CLEARANCES

At right is a diagram depicting dimensions for clearances around the baggage makeup carousels. As shown, the arrangement and locations of the carousels allows for ample turning and maneuvering space for tugs around and between the two carousels. Each carousel is provided with a loading lane as well as a bypass lane. Ample clearance is maintained between the tug lanes and the surrounding perimeter walls. Additional space for cart storage is provided in the southeast corner of the space. The covered parking area for ground service equipment, immediately adjacent to the makeup area, is centrally located and served by a vehicle service road (VSR).

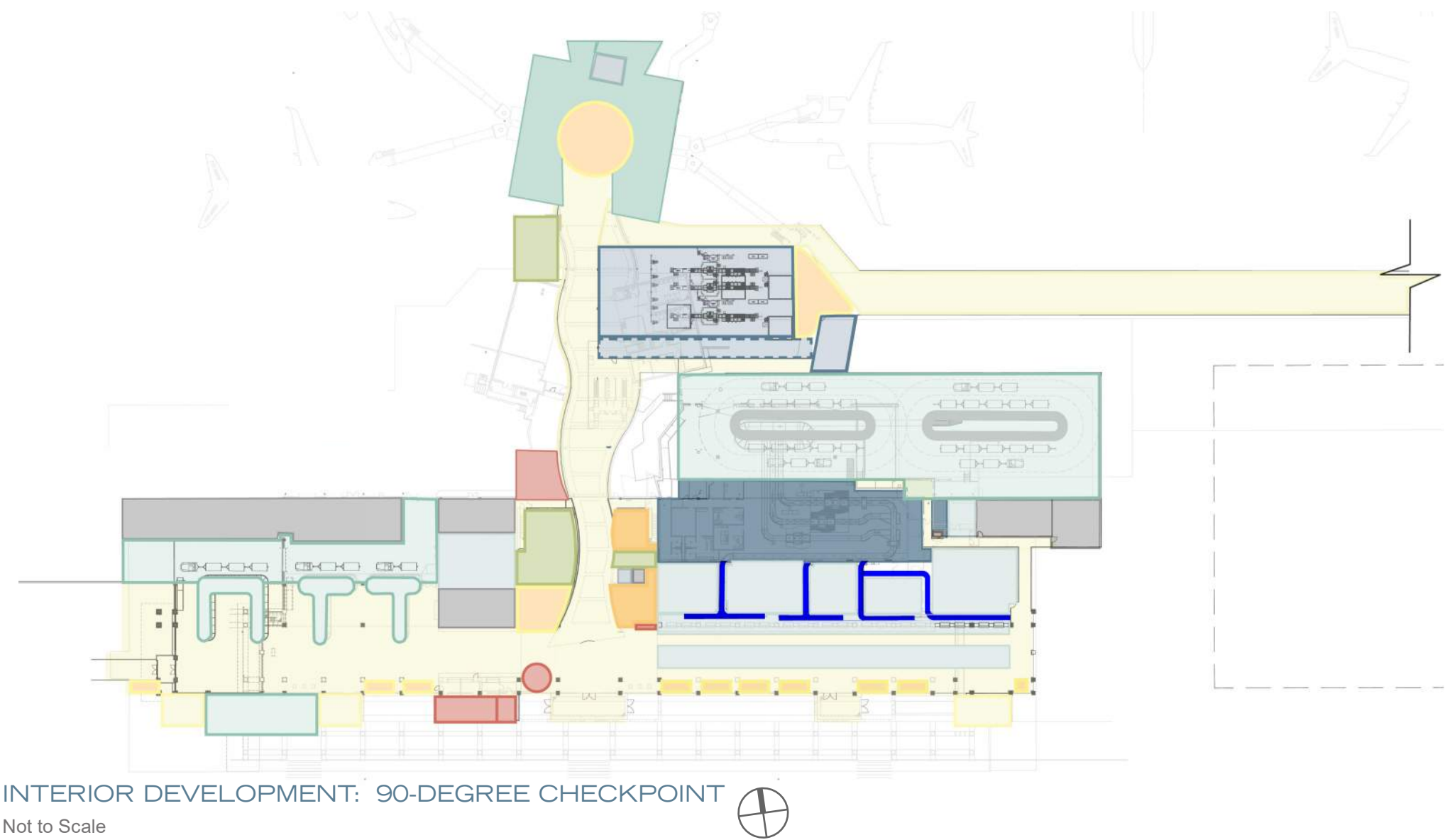


BAGGAGE MAKEUP AREA CLEARANCES
Not to Scale

J: INITIAL ALTERNATIVES — INTERIOR DEVELOPMENT

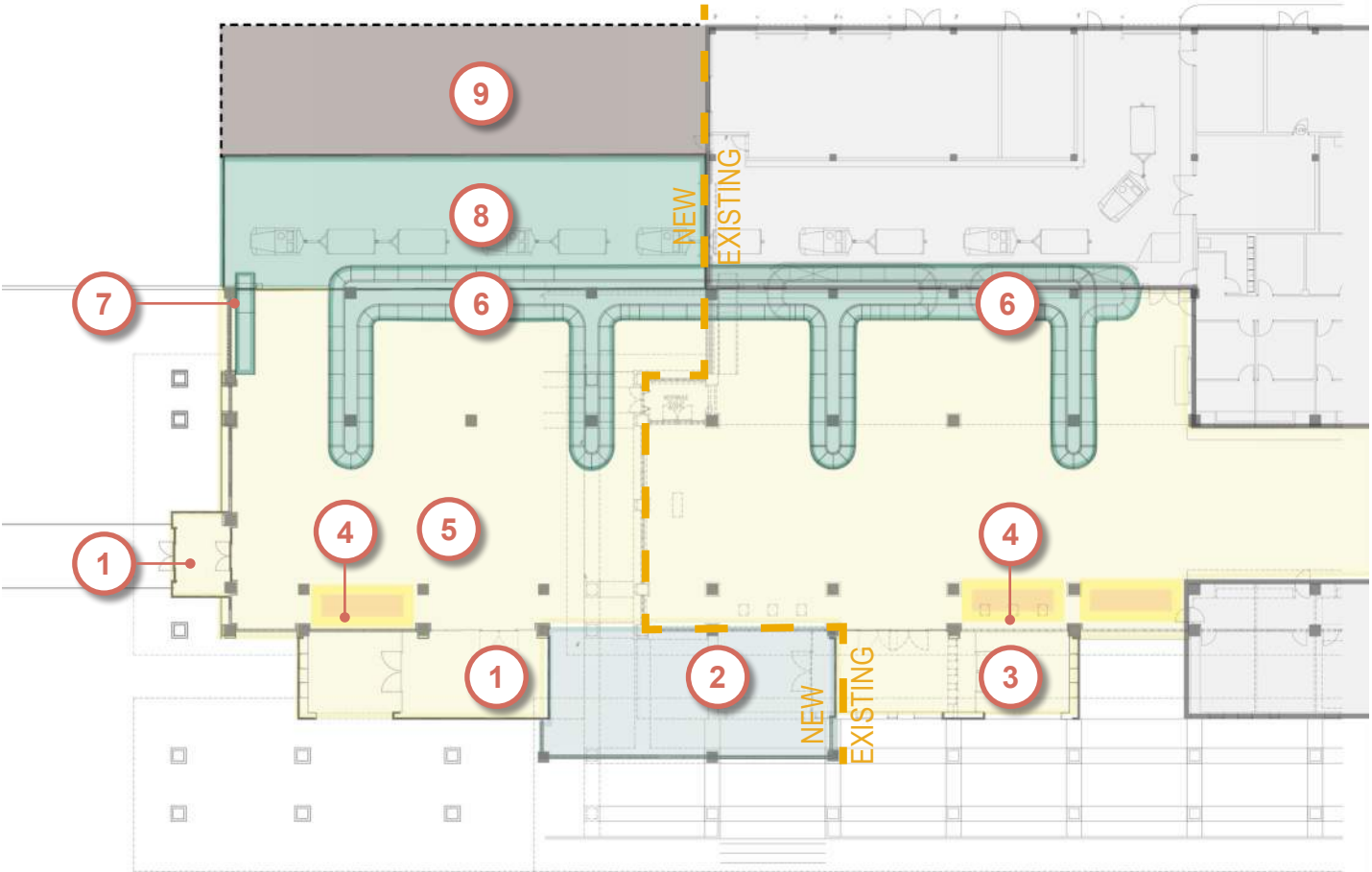
CHECKPOINT — 90-DEGREE ORIENTATION

At right is shown a configuration of the terminal and concourse that rotates the SSCP by ninety degrees, as requested for study by the airport. The impact of this adjustment on passenger movement can be anticipated. In this arrangement, departing passengers leaving on flights from the existing main pod holdroom need to back-track toward the pod as they exit the checkpoint, crossing paths with arriving passengers headed to the main terminal using the exit corridor.



BAGGAGE CLAIM

At right is an alternative layout of the baggage claim carousels in the Baggage Claim Hall from that shown on pg. 26, depicting a single continuous belt per request by the airport. This alternative arrangement is not recommended for logistical and phasing reasons. The full design of the carousels and claim hall is to be developed as the project moves into design phases with baggage handling consultants and when architectural design services are more deeply engaged.



PRE-SECURITY: BAGGAGE CLAIM AND WEST TERMINAL — ALTERNATE

DIAGRAM KEY NOTES

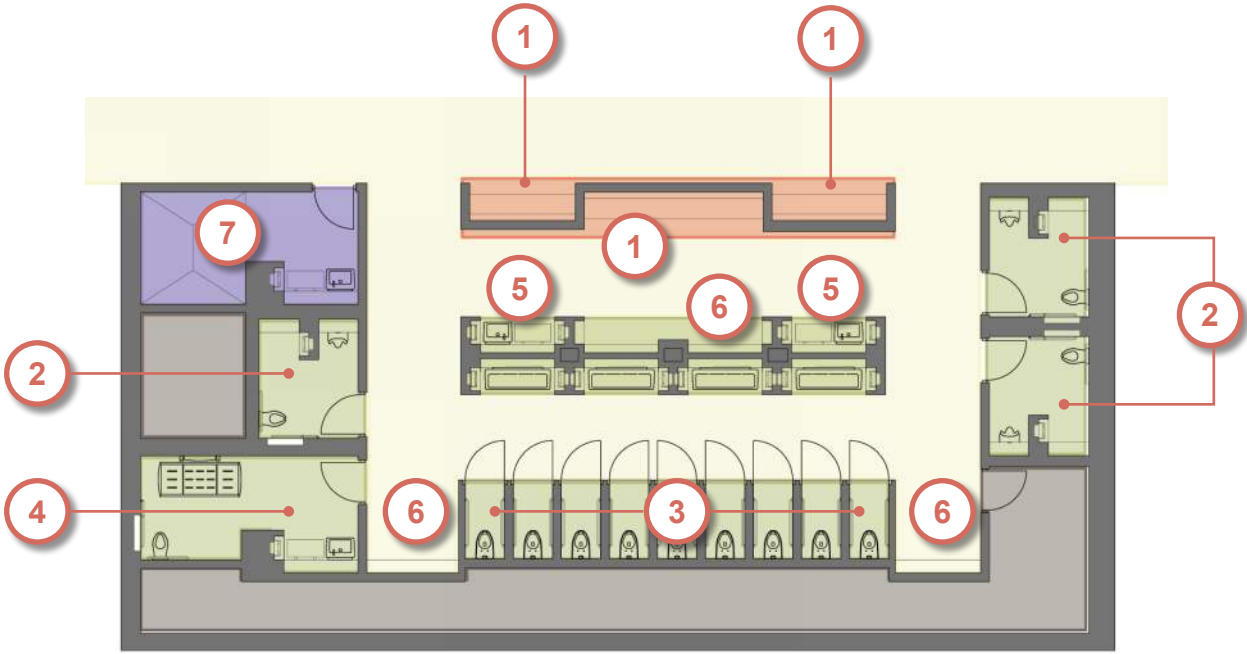
- 1. New vestibule
- 2. Expansion: rental car offices
- 3. Renovated and expanded vestibule
- 4. Lounge seating area
- 5. Expanded bag claim hall
- 6. New baggage carousel
- 7. Oversize bag belt
- 8. Tug area / bag laydown
- 9. Possible building support / infrastructure expansion

K: ADDITIONAL RESTROOM CONCEPT PROTOTYPES

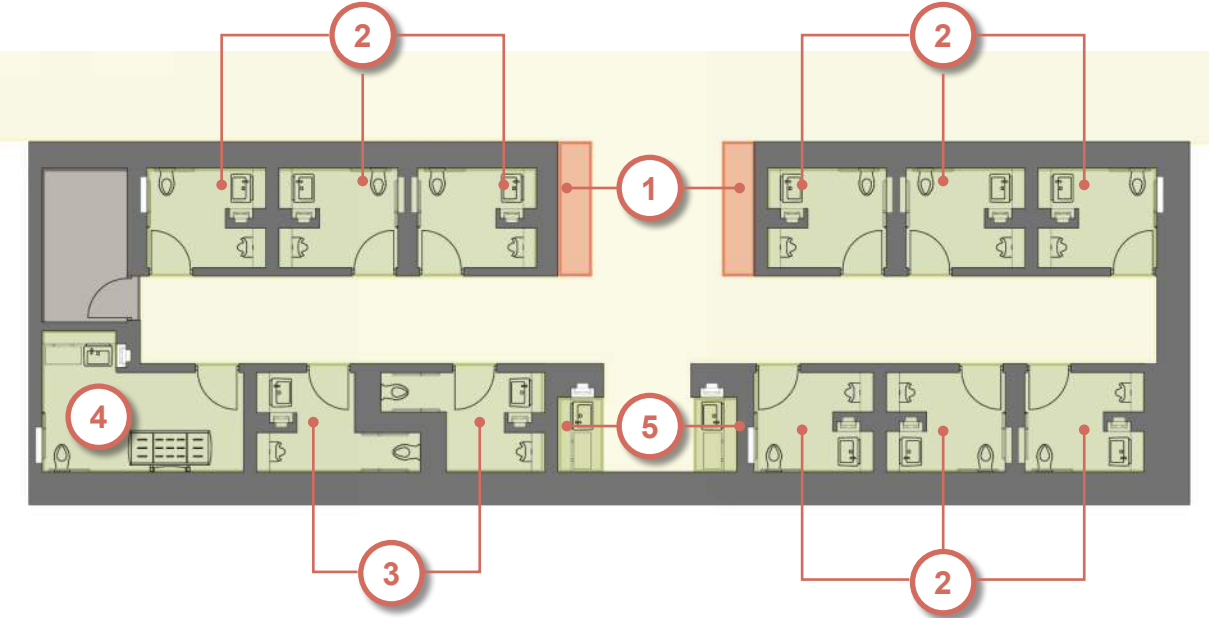
Below and at right are three other prototypical restroom modules representing “Restroom of the Future” concepts including gender neutral facilities.

DIAGRAM KEY NOTES

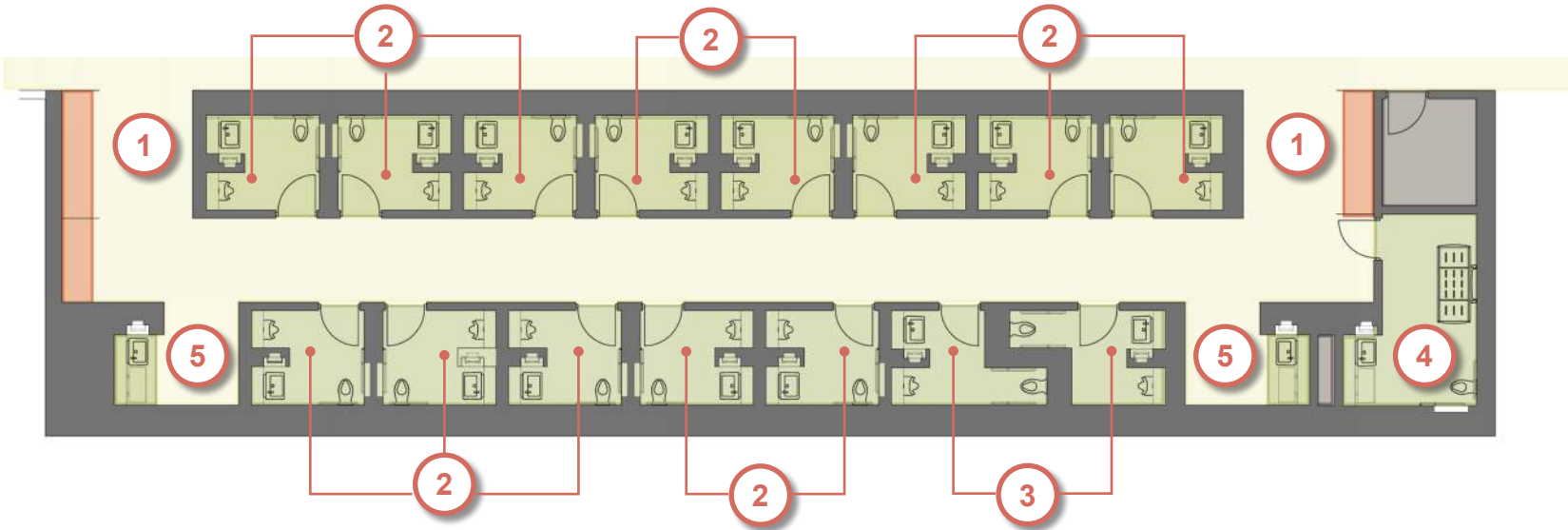
- 1. Waiting/Lounge with opportunity for art
- 2. Accessible stalls
- 3. Ambulatory stalls
- 4. Family/Companion Care/Changing Table restroom
- 5. Baby-Changing nodes
- 6. Grooming area
- 7. Service animal relief area (SARA)



12-UNIT RESTROOM BLOCK PROTOTYPE
Not to Scale



12-UNIT RESTROOM BLOCK PROTOTYPE — WITH URINALS
Not to Scale

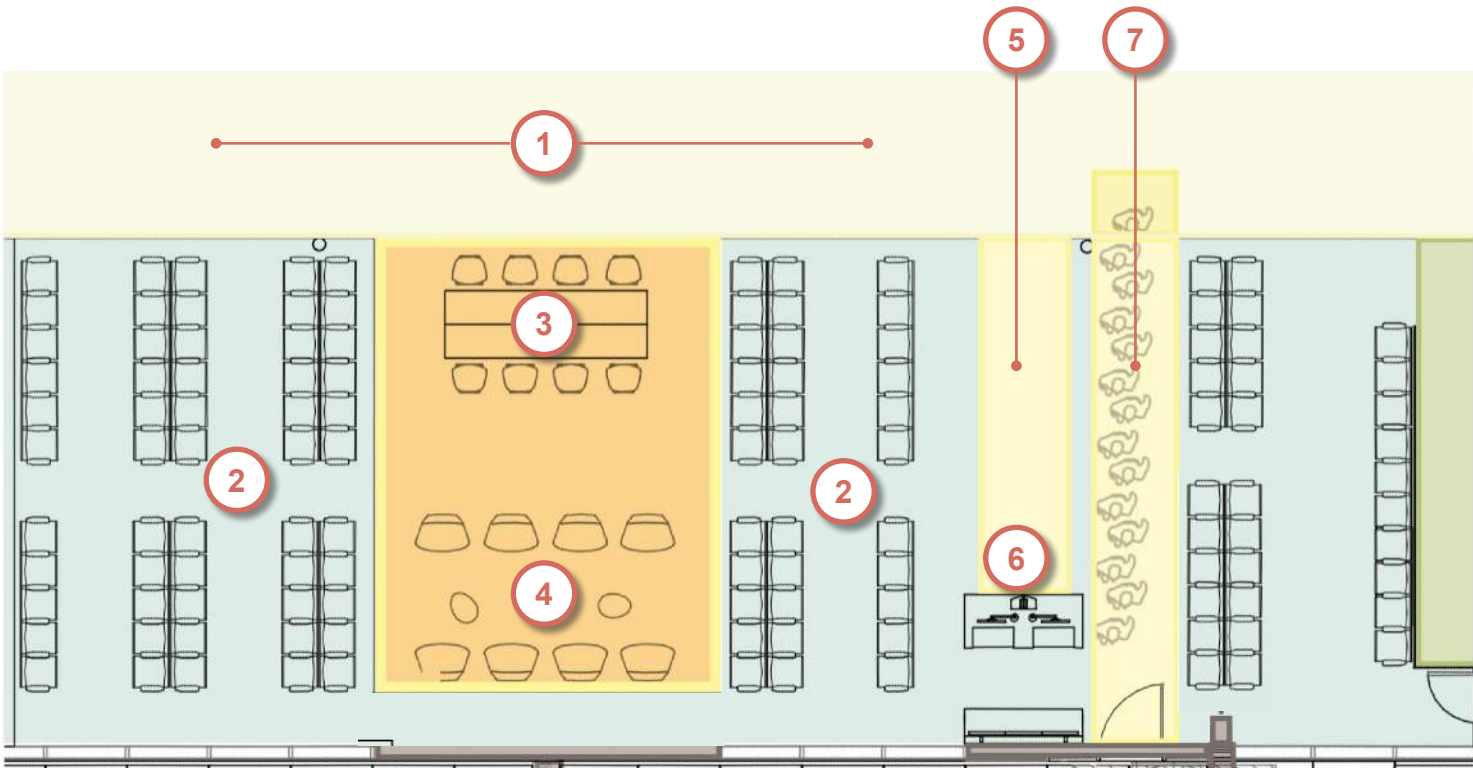


16-UNIT RESTROOM BLOCK PROTOTYPE — WITH URINALS
Not to Scale

L: PROTOTYPICAL GATE HOLDROOM CONFIGURATION

At right is a prototypical layout of a gate holdroom that may be similar to possible layout solutions implemented at TVC as the project moves into detailed design. Beam seating, a workhub with stools, and lounge seating offer a variety of passenger accommodations. Near the boarding doors are airline gate functions with ample space for boarding and queueing.

- DIAGRAM KEY NOTES
- 1. Concourse primary circulation
 - 2. Beam seating area
 - 3. Work hub
 - 4. Lounge seating area
 - 5. Gate podium queuing
 - 6. Gate podium
 - 7. Boarding/deplaning aisle



POSSIBLE TYPICAL CONCOURSE GATEHOLD CONFIGURATION

Not to Scale

M: CONCESSIONAIRE SURVEY

Food & Beverage

- 63% of respondents were “very satisfied” or “satisfied” with the Airports F&B selection (compared to national average TVC ranked above average).
- Revenue per Enplaned Pax (RPE) for 2018-2019 was below national average for airports at 2M pax or fewer.
- 57% of pax said they purchased F&B at the Airport, with 85% of them purchasing post SSCP.
 - o Consultants conclude F&B vendors are providing adequate options for those who plan to eat in advance at TVC but F&B not attracting customers in its own right.
- F&B price points at TVC are correctly aligned with 68% indicating prices were “good/very good/excellent.”
- F&B cleanliness, speed, and efficiency all received very high marks.
- Strongest preference was for restaurant/table service, followed by fast food, and then café (without table service).
 - o According to the consultant, the likelihood of a sit-down restaurant being viable is low and is not recommended
 - o It would become viable if with more year-round traffic; it is unsustainable with seasonal service.
 - o One option to explore was to offer and test table service in the existing café
- Almost 50% indicated a greater variety of food options and nearly 23% indicated additional food/coffee/snack options post SSCP.

News & Gift

- Nearly 50% “very satisfied” or “Satisfied” with News & Gift selections, other 50% neutral.

Overall

- Greater than 70% indicated either “Excellent” or “Very Good” with regards to overall experience at the Airport.
- Off the relevant comments received, requests included additional flights, more charging outlets and lounge chairs, covered parking, and healthier food options.
- Consultant suggested testing a beverage bar (local beers and wines) in the gatehold area during busy times.
- Pursue a license/permit for “roaming alcohol” where purchased in the café and take to gatehold area.
- Of the 43% which indicated they didn’t buy anything majority were afternoon/evening travelers.
 - o Consultant suggests tapping into these travelers by offering more snack and light fare options.



TVC Concessions Survey & Analysis

Introduction & Background

As part of strategic planning initiatives for the Cherry Capital Airport (TVC), Steven Baldwin Associates (SBA) conducted a customer survey to measure the level of interest in covered parking at the Airport between May 1 and June 12, 2019. As part of that survey, customers were asked to comment about their overall experience at TVC; passenger feedback indicated that the concessions offerings at TVC were one of the top areas of concern.

Based upon these findings, a separate survey specifically targeted towards concessions satisfaction was deemed necessary to gain insight into TVC concessions operations and customer preferences.

The primary goals of the study were to:

1. Measure the level of satisfaction with current concessions options,
2. Identify the preferred type of services and options, and
3. Gain feedback on methods to improve concessions offerings and customer satisfaction.

Methodology

The study was performed using an online survey linked to the Airport Wi-Fi. The survey was developed in coordination with Airport management and the current airport concessionaire. Survey pathways were triggered by customer responses to specific questions and the survey overall was determined to have achieved statistical relevance.

About the Survey Sample

In total, the survey contained 15 questions, which can be found in **Attachment 1**.

The survey was posted for a total of 43 days (six weeks) from November 27, 2019 to January 9, 2020. During that time, a total of 1,190 customers completed the survey. Approximately 39% of survey responses were completed in the AM, and 61% completed in the PM. To ensure that the survey was taken by Airport users, only customers who were at the Airport and connected to the TVC Wi-Fi were linked to the survey. The survey was additionally marketed by a banner within the Airport to direct customers to the Wi-Fi for greater participation.

While the survey was being deployed, it was calculated that in order to achieve statistical relevancy at a desired level of greater than 95% confidence interval (and plus or minus 3% margin of error), a survey sample of at least 1,064 respondents was necessary for a population size¹ of 350,000 people (i.e., the approximate number of annual enplanements at the Airport). If, however, one considers that the annual enplanements actually consist of some of the same people using the airport multiple times a year, a

¹ Population is the number of people whose opinion or behavior the sample size would represent.

population size of 116,666 was tested as well; a population of 116,666 assumes the average person flying out of TVC uses the Airport three (3) times per year. Applying this sensitivity to the matter of relevancy demonstrated that the number of surveys collected, 1,190, was more than adequate in order to achieve a high degree of confidence in the results along with a small margin of error. See Figure 1 below.

Figure 1. Confidence Interval for Concessions Study

Population Size Based on Enplanements	Confidence Interval	Margin of Error	Number of Surveys Required	Actual Number of Surveys Collected
350,000	95%	+/- 3%	1,064	1,190
116,666	95%	+/- 3%	1,058	1,190

An analysis of the survey results follows.

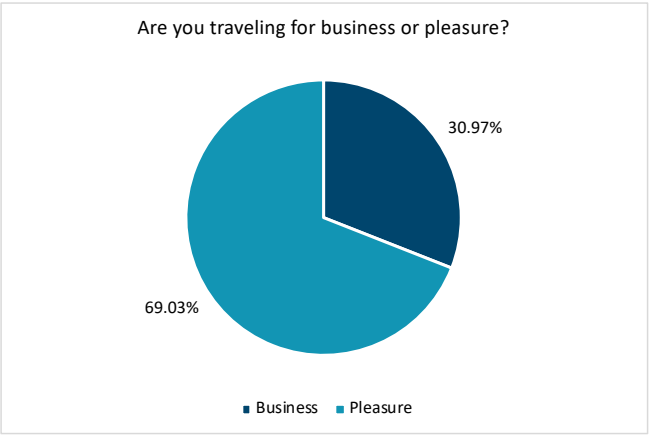
Survey Analysis

Below is a review and analysis of the survey question by question.

Q1. Are you traveling for business or pleasure?

TVC survey results indicate a ratio of 1 to 2.2 of business travelers to leisure travelers, with approximately 31% of travelers for business and approximately 69% for pleasure. It is also worth noting that the timeframe of the survey—which was conducted during the busy holiday travel season between Thanksgiving and New Year's—may have had an anomalous effect on the volume of leisure traveler responses. See Figure 2 below. Also, as an industry standard, leisure or pleasure travelers as a rule tend to spend more money and time shopping at a terminal than business travelers.

Figure 2. Business v. Leisure/Pleasure Travelers



Q2. How many people are in your party?

Approximately 60% of passengers were traveling alone. This percent is of interest when compared to Q1, as industry-wide leisure travel is typically undertaken by couples or families (with the exception of groups meeting at “destination locations” who travel to and from their destinations individually). The Airport should seek to fully understand the joint leisure traveler and individual traveler figures by crossing regional population demographic data against the survey responses. However, aviation industry figures also show that more than 40% of business trips are extended for leisure purposes by single passengers. According to the U.S. Travel Association, the top leisure travel activities for U.S. domestic travelers in 2018 include: 1) visiting relatives; 2) shopping; 3) visiting friends; 4) fine dining; and 5) sightseeing. See Figure 3 below.

Figure 3. Number of People in Each Party

People in Traveling Party	Percentage
1	60.84%
2	24.35%
3	5.68%
4	4.04%
5	2.58%
6	0.43%
7+	2.08%

Q3. What is the zip code of your primary residence?

The highest ranked zip code of passengers was 49686 at 9% of respondents, representing Traverse City, Garfield Township, and Old Mission. The top ten zip codes combined represented 32% of passengers and included the areas of Grand Traverse County, Leelanau County, Emmet County, Charlevoix County, Benzie County, and Kalkaska County. Approximately 54% of total passengers reside in Michigan. This denotes a very even mix between origin and destination travelers at TVC. See Figures 4.1 - 4.4 below.

Figure 4.1. Top Zip Codes of Respondents

Zip Code	Location – MI Cities	Percentage	Rank
49686	Traverse City, Garfield Township, Old Mission	9%	1
49684	Traverse City, Garfield Township, Elmwood Charter Township, Bingham	7%	2
49685	Garfield Township, Long Lake Township, Chums Corner	5%	3
49696	Garfield Township, Mayfield	3%	4
49690	Acme, Yuba, Williamsburg, Angel	2%	5
49770	Petoskey, Epsilon, Bay View, Conway	1%	6
49720	Charlevoix, Boulder Park, Bay Shore, Norwood, Phelps, Burgess	1%	7
49643	Interlochen, Grant Township, Karlin	1%	8
49740	Harbor Springs, Good Hart, Stutsmanville, Pleasant View, Cross Village	1%	9
49646	Kalkaska, Angling	1%	10

Figure 4.2. Top Two Zip Code Areas (Representing 16% of All Respondents)



Figure 4.3. Zip Code Heat Maps of Respondents – Upper MI and Regional

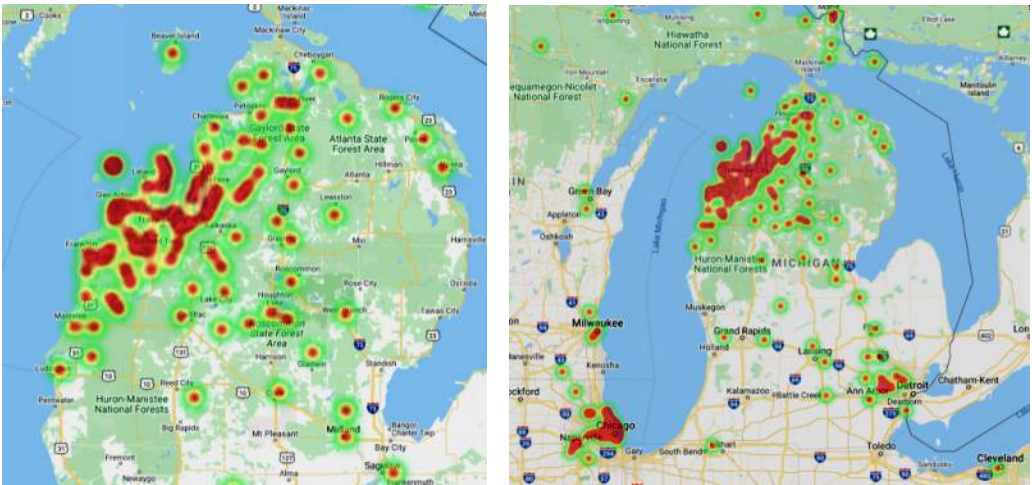


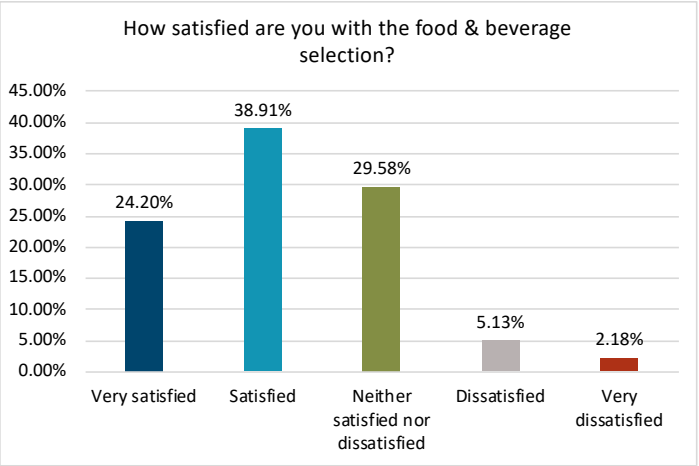
Figure 4.4. National Zip Code Heat Map of Respondents



Northwestern Regional Airport Commission / Cherry Capital Airport
727 Fly Don't Drive, Traverse City, MI | Phone: 321.947.2250 | Fax: 231.947.4329
Email: admin@tvcairport.com | Web: www.TVCairport.com

Q4. How satisfied are you with the food & beverage selection at the Airport?
Approximately 63% of respondents were “very satisfied” or “satisfied” with the Airport’s Food & Beverage selection. Compared to the national average, TVC ranked above average in this regard. See Figure 5. below.

Figure 5. Satisfaction with Food & Beverage Options



Northwestern Regional Airport Commission / Cherry Capital Airport
727 Fly Don't Drive, Traverse City, MI | Phone: 321.947.2250 | Fax: 231.947.4329
Email: admin@tvcairport.com | Web: www.TVCairport.com

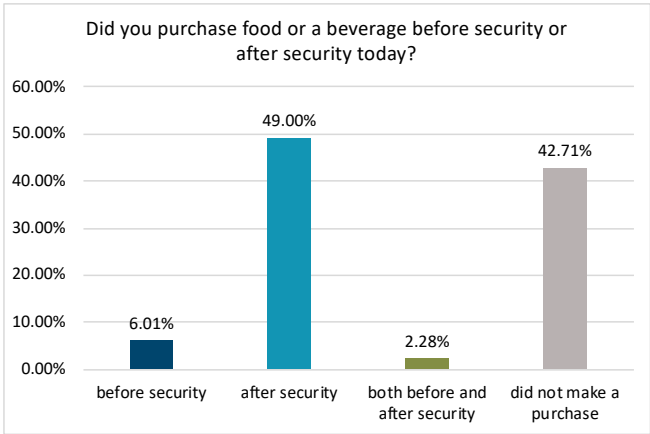
Q5. Did you purchase food or beverages before security or after security today?

NOTE: TVC’s Food and Beverage, Revenue Per Enplaned passenger (RPE) is \$4.16 averaged for 2018 and 2019. As a point of reference, the national Food and Beverage average RPE for small airports (2M passengers or less) in 2018 was \$5.67. Typically, the root of an underperforming RPE are passengers who do not make any purchases.

Per the concessions survey, approximately 43% of respondents did not purchase anything. Of these, respondents who did not purchase anything in the morning (AM) represented 17% of all respondents, and respondents who did not purchase anything in the afternoon (PM) represented 26% of all respondents.

For the approximately 57% of respondents who did purchase food and beverage at the airport, nearly 85% of them made their purchase post-security. The responses to this question suggest that the Food & Beverage vendors are providing adequate options for those who plan in advance to eat at TVC, but F&B is not attracting customers in its own right. See Figure 6 below.

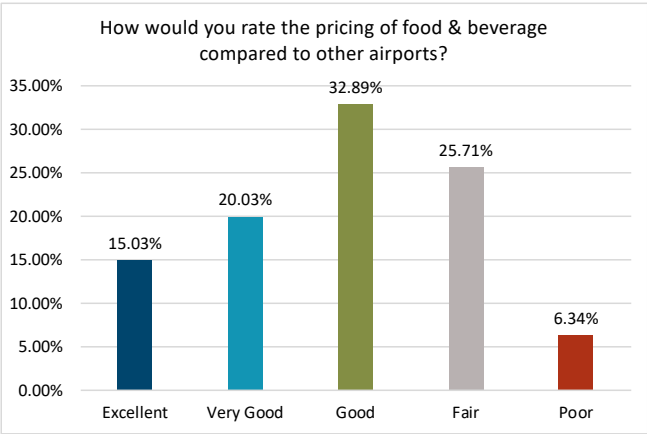
Figure 6. Respondents Who Purchased Food & Beverage



Q6. How would you rate the pricing of food & beverage compared to other airports?

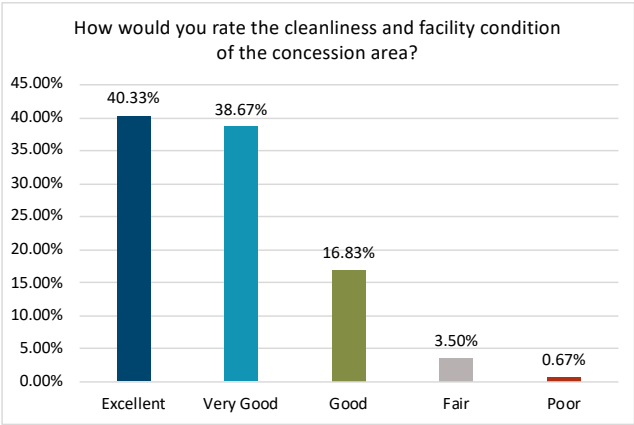
In general, airport pricing tends to be higher than street pricing and passengers are rarely “happy” with pricing overall; the typical industry dispersion is heaviest around the mid-range and higher. Thus, the fact that approximately 68% of respondents reported that the TVC prices were “good/very good/excellent” is better than the industry average and is a strong sign that price points at TVC are correctly aligned. See Figure 7 below.

Figure 7. Comparative Pricing of Food & Beverage



Q7. How would you rate the cleanliness and facility condition of the concession area?
TVC received very high marks in this area. Overall, the industry tends to have some issues with cleanliness, or at least public perception of it. In general, the industry ranks lower than the results for TVC in this category, which received a 79% satisfaction level when combining “excellent” and “very good” responses. See Figure 8 below.

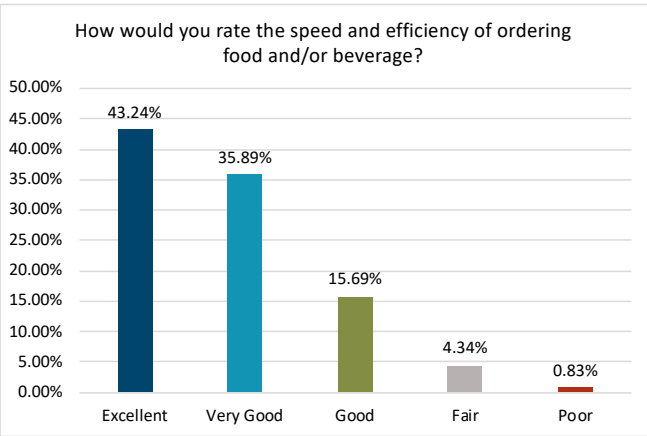
Figure 8. Cleanliness of Concession Area



Northwestern Regional Airport Commission / Cherry Capital Airport
727 Fly Don't Drive, Traverse City, MI | Phone: 321.947.2250 | Fax: 231.947.4329
Email: admin@tvcairport.com | Web: www.TVCairport.com

Q8. How would you rate the speed and efficiency of ordering food and/or beverage?
TVC received very high marks in this category, outperforming industry averages. Combined responses for “excellent” and “very good” were approximately 79%. When the category “good” is added, the combine total is approximately 95%. Industry-wide issues regarding speed and efficiency tend to center around sit-down Food & Beverage locations (with lack of speed of service impacting boarding times). As TVC does not have a true sit-down service option, this may be one reason TVC is outperforming the industry in this area. See Figure 9 below.

Figure 9. Rating of Speedy and Efficiency of Food & Beverage



Northwestern Regional Airport Commission / Cherry Capital Airport
727 Fly Don't Drive, Traverse City, MI | Phone: 321.947.2250 | Fax: 231.947.4329
Email: admin@tvcairport.com | Web: www.TVCairport.com

Q9. Please rate the concession delivery options you prefer most. (1-6 with 1 being most desired)

While analyzing the results of this question, it is important to note that passengers may indicate via surveys that they prefer certain items, but the reality is that 1) when offered, they may not choose the items, and 2) it may not be viable to provide the offerings. While this question provides insight into what respondents say they would prefer for future changes, any actual concessions changes would need to be supported by detailed planning and further analysis of current and projected sales and revenue metrics, traffic flow and dwell time, customer demographics, and enplanements, etc.

In response to this question, the strongest preferences were for 1) restaurant/table service, 2) fast food, and 3) café (without table service). The least desired option was for gate-based vending or kiosks. Generally in the industry, business travelers gravitate toward the “grab and go” options as well as higher scale options, while leisure travelers tend to prefer sit-down options. Fast food options usually pull a little from both pools and tend to do better with medium and low-income travelers and traveling families. But in this case, TVC travelers are indicating a very high preference for restaurant/table service and fast food options within the survey’s population of leisure passengers traveling alone. See Figure 10 below.

Figure 10. Ranking of Preferred Concessions Delivery Options

Please rate the concession options you prefer most. (1-6 with 1 being most desired)							
	1	2	3	4	5	6	Rank
Restaurant/Table Service	24.25%	37.01%	19.37%	7.72%	6.14%	5.51%	1
Fast Food	32.44%	23.78%	17.17%	10.39%	7.56%	8.66%	2
Café (no table service; self-seating after purchasing)	29.29%	17.48%	12.28%	8.98%	27.40%	4.57%	3
App-Based/Kiosk Ordering and Delivery	8.50%	10.39%	34.65%	23.15%	12.28%	11.02%	4
Vending Machine	2.68%	5.67%	9.13%	34.02%	23.78%	24.72%	5
Gate-based Option (vending/kiosk)	2.83%	5.67%	7.40%	15.75%	22.83%	45.51%	6

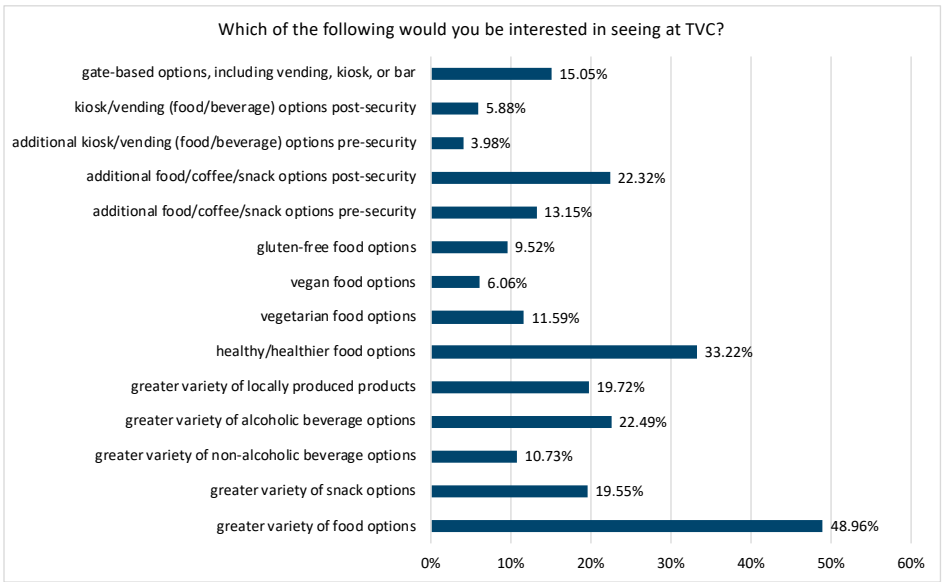
Q10. Which of the following food options would you be interested in seeing at TVC? (check all that apply)

The most popular response (chosen by approximately 50% of respondents) indicated a desire for a greater variety of food options.

The second most popular response at approximately 33% was a desire for healthier food options. Typical industry experience indicates that passengers often ask for healthier options, but when healthy concepts are introduced, these options primarily do well with more affluent and/or highly educated passengers (i.e., those who seldom eat fast food in their everyday lives). Passengers at TVC may fit this demographic well based on their responses and the wide variety of up-scale travel/leisure destinations and attractions of the region.

Another result of note is that almost a third (27%) of respondents asked for either vegetarian, vegan, or gluten-free options; by adding a gluten-free option that is also vegan, all of these respondents would be addressed. Additionally, nearly 23% of survey respondents indicated that they would like to have a greater variety of alcoholic beverage options at TVC. For the full data on food option preferences, please see Figure 11. below.

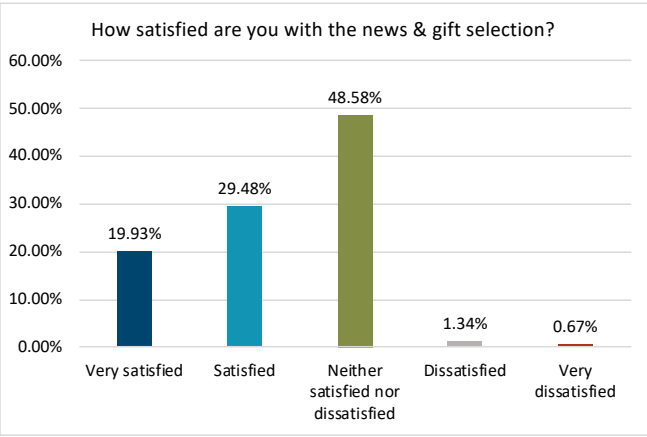
Figure 11. Food Option Preferences



Q11. Please feel free to offer additional comments about your choices from the previous question.
There were 124 comments left for Q11 spanning a variety of topics. However, the majority of responses were not relevant or the equivalent of “no answer.” Those respondents who did address food options included requests for bar service, healthier options, and sit-down food service.

Q12. How satisfied are you with the news & gift selection?
Approximately half of all respondents reported being “very satisfied” or “satisfied” with the news and gift selection. And approximately 50% were neutral on the question. In general, travelers look for the following things in regard to news & gifts: 1) some type of emergency toiletry (e.g., travelers who forgot hygiene necessities, or someone experiencing an over-the-counter medical need, etc.), 2) books and other print media, and 3) unique souvenirs with a sense of place. For the approximately 50% of respondents who were neither satisfied nor dissatisfied, SBA suggests discussing with the vendor the ability to expand options in these three categories. See Figure 12 below.

Figure 12. Satisfaction with New & Gift Options



Q13. Please feel free to offer additional comments about the news & gift selection.
There were 89 responses to this question. However, the majority of responses were not relevant or the equivalent of “no response.” For those who did leave relevant comments, the responses included: desire for more variety of books and magazines, positive responses to the area-specific and sense-of-place offerings, desire for increased hours, and a desire for more local goods from local shops and more cherry-related products.

Q14. How would you rate your overall experience at the Airport today?
Out of 584 responses, more than 70% rated their overall experience either “excellent” (42%) or “very good” (31%). These strong overall numbers indicate that TVC has a solid program from a customer service and satisfaction standpoint. In previous comments, several positive comments were made of the cleanliness of the facilities and the friendliness of the staff and vendors. See Figure 13 below.

Figure 13. Overall TVC Experience



Q.15 Please feel free to offer any additional comments about food/beverage or news/gifts at TVC or your Airport experience in general.
This question was answered by 88 respondents. As with the other comment boxes, the majority of responses were the equivalent to “no comment.” Of those who did leave relevant comments, many were complimentary regarding the Airport and particularly regarding the cleanliness, friendliness, and ease of access and small scale. Requests included a desire for additional flights, more charging outlets and lounge chairs, covered parking, and healthier food options. Complaints included dissatisfaction with TSA competence and friendliness and delayed flights (particularly because of snow).

Conclusion

Overall High Levels of Satisfaction
The survey indicated overall positive feedback for the concession offerings at the Cherry Capital Airport.

- As shown in Question 4., respondents gave high marks on their level of satisfaction with the Food & Beverage, with approximately 63% being “satisfied” or “very satisfied.” With approximately 30% responding with “neither satisfied nor dissatisfied,” only 7% reported being either “dissatisfied” or “very dissatisfied.” See Figure 5 below.
- As shown in Question 12., nearly half (49%) of respondents rated their view of News & Gifts as “very satisfied” or “satisfied.” Approximately the same number (49%) indicated they were

“neither satisfied nor dissatisfied,” which left only 2% indicating “dissatisfied” or “very dissatisfied). See Figure 12 below.
Figure 5. Satisfaction with Food & Beverage Options

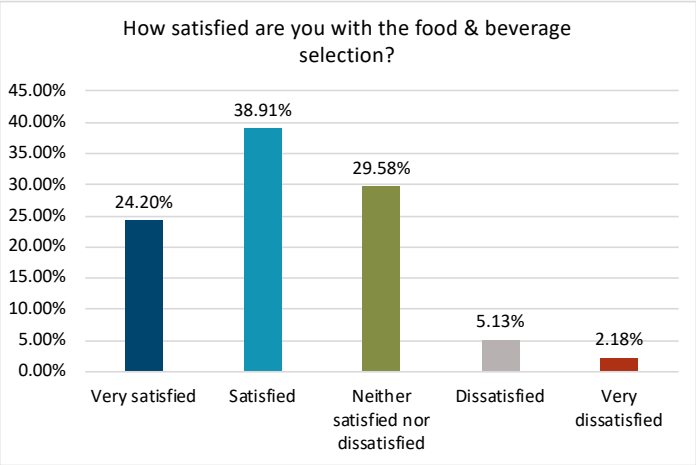
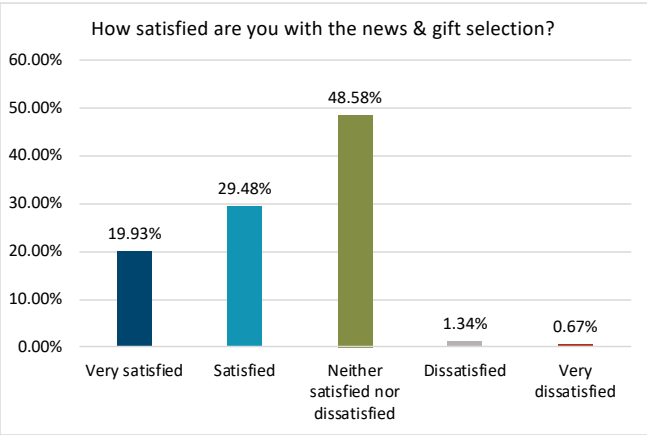


Figure 12. Satisfaction with New & Gift Options



Survey results suggest offerings can be further enhanced to customers preferences as follows:

Northwestern Regional Airport Commission / Cherry Capital Airport
727 Fly Don't Drive, Traverse City, MI | Phone: 321.947.2250 | Fax: 231.947.4329
Email: admin@tvcairport.com | Web: www.TVCairport.com

Concessions Delivery Options

Per Question 9 inquiring about concessions delivery options, the top request was for a sit-down restaurant with table service, with the other options ranked as follows:

- Sit-down restaurant with table service (1st)
- Fast food outlet (2nd)
- Café (no table service; self-seating after purchase) (3rd)
- App-based/Kiosk ordering and delivery (4th)
- Vending machines (5th)
- Gate-base option (kiosk or vending) (6th)

Even though the survey indicated the sit-down restaurant with table service as the respondents’ top option, there is not a high likelihood of this option being viable and it is not recommended. A table service restaurant could perhaps become viable in the future with more traffic year-round, but current conditions, and those for the foreseeable future, make this option unsustainable. However, one way to explore table service would be to use the existing café, and test table service on a seasonal basis (i.e., busy summer months). If proven economically feasible on a seasonal basis, the service could potentially be continued year-round consistent with the increase in passenger levels.

Concessions Offerings

Per Question 10, respondents listed their most desired preferences for food and beverage options. The top four requests were as follows:

- Greater variety of food options – 49%
- Healthier food options – 33%
- Greater variety of alcoholic beverage options – 22.5%
- Additional food/coffee/snack options post-security – 22.3%

Requests for Greater Variety of Food Options & Healthier Food Options

With almost half of the survey respondents requesting a greater variety of food options and 33% specifically requesting healthier food options, we recommend that the café continue offering their current menu items that have proven successful with an expansion to include more healthy/healthier food options for customers. This would both provide a greater variety for all passengers and meet the requests for healthy/healthier food.

Increased Alcohol Options

Survey respondents also requested increased options for alcohol. Some options to pursue this request include:

- Establishing alcohol in the gate/hold area; this could be tested with a beverage bar that features local beers and wines. To minimize operational costs, the concessionaire may desire to open the concession at peak periods and close it when the terminal is less busy.
- Pursue a license/permit for roaming alcohol (i.e., buy at café and take down to gate area). Airport assistance in obtaining the necessary licensing to do so may be required.

Northwestern Regional Airport Commission / Cherry Capital Airport
727 Fly Don't Drive, Traverse City, MI | Phone: 321.947.2250 | Fax: 231.947.4329
Email: admin@tvcairport.com | Web: www.TVCairport.com

- Also, partnering with local companies, such as a local winery/brewery, would help promote the many offerings that the region provides as well as increasing the sense of place within the terminal.

Please note that passenger preferences as indicated within a survey and actual passenger spending do not always align. When launching any new offerings, the concessionaire and Airport should carefully review all aspects of passenger demographics and statistics available to help guide final decisions.

Non-Purchasers

In Question 5, approximately 43% respondents indicated that they did not purchase anything at the airport from the concessionaire. An analysis indicated that the majority of these passengers were afternoon/evening travelers. The café should consider tapping into this population by offering more snack and lite fare options to appeal to passengers during this time period. Moreover, of those respondents that purchased nothing, approximately 43% said they would like greater variety of food options and 35% stated that they prefer fast food options. The concessionaire should consider this input while striving to realize sales from this group of non-purchasing passengers. The goal is to implement a concessions program that can attract a greater percentage of passengers through its offerings, while also providing a high level of service to ensure repeat customers. The Airport should initially look at the combination of marketing and product offerings in regard to these non-purchasing passengers. Moreover, the Airport should actively encourage the concessionaire to market its concepts and products within the terminal to help drive the purchasing of products.

Metrics

TVC should actively track gross sales and Revenue per Enplaned Passenger metrics in order to better understand the concessions operations and set goals for the performance of concessions. Having this data over time can indicate month to month and year over year trends to assist the Airport in benchmarking the concessions operation as well as to facilitate discussions with the concessionaire regarding increased offerings and sales.

Using the information found within this report, TVC can work with the concessionaire to make suggested improvements, expand current offerings, increase passenger satisfaction, grow the percentage of concession users, and increase concessions revenue.

**Attachment 1:
TVC Concessions Survey Questions**

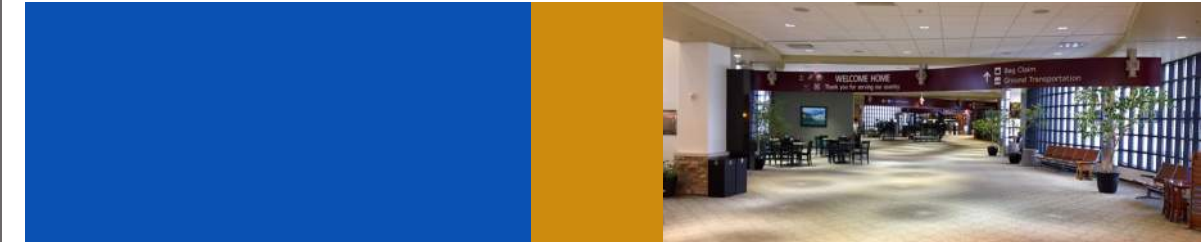
1. Are you traveling for business or pleasure?
2. How many people are in your party?
3. What is the zip code of your primary residence?
4. How satisfied are you with the food & beverage selection at the Airport?
(selections: "very satisfied," "satisfied," "neither satisfied nor dissatisfied," "dissatisfied," "very dissatisfied")
5. Did you purchase food or a beverage before security or after security today?
(selections: "before security," "after security," "both before and after security," "did not make a purchase")
6. How would you rate the pricing of food & beverage compared to other airports?
(selections: "excellent," "very good," "good," "fair," "poor")
7. How would you rate the cleanliness and facility condition of the concession area?
(selections: "excellent," "very good," "good," "fair," "poor")
8. How would you rate the speed and efficiency of ordering food and/or beverage?
(selections: "excellent," "very good," "good," "fair," "poor")
9. Please rate the concession options you prefer most. (1-6 with 1 being best)
(selections: "fast food," "restaurant/table service," "app-based kiosk ordering and delivery," "café, no table service; self-seating after purchasing," "gate-based option, vending/kiosk")
10. Which of the following would you be interested in seeing at TVC? (check all that apply)
(selections: "greater variety of food options," "greater variety of snack options," "greater variety of non-alcoholic beverage options," "greater variety of locally produced products," "health/healthier food options," "vegetarian food options," "vegan food options," "gluten-free food options," "additional food/coffee/snack options, pre-security," "additional food/coffee/snack options, post-security," "additional kiosk/vending food/beverage options post-security," "gate-based options, including vending, kiosk, or bar")
11. Please feel free to offer additional comments about your choices from the previous question.
12. How satisfied are you with the news & gift selection?
(selections: "very satisfied," "satisfied," "neither satisfied nor dissatisfied," "dissatisfied," "very dissatisfied")
13. Please feel free to offer additional comments about the news & gift selection.
14. How would you rate your overall experience at the Airport today?
(selections: "excellent," "very good," "good," "fair," "poor")
15. Please feel free to offer any additional comments about food/beverage or news/gifts at TVC or your Airport experience in general.

N: PARKING SURVEY AND FUTURE NEEDS

Based upon Stephen Baldwin Associates’ parking survey (included at right and on the following pages) and forecasted passenger growth, a simplified extrapolation of parking needs was developed as shown below. However, many changes within the parking industry and transportation are occurring, and a more in-depth parking study is recommended as the project progresses to address future parking requirements.

Year	Forecasted Annual Enplanements ¹	Estimated Total Pax Auto Parking ²	Anticipated Short-term Demand ³	Anticipated Long-term Demand ³
2025	374,704	1762	863	899
2030	478,788	2251	1103	1148
2035	646,068	3037	1488	1549

- Notes:
- 1) Annual Enplanement Forecast: TVC Commercial Service Activity Forecasts by P&N, 2021
 - 2) Parking Space per Enplanement from TVC MP, due to seasonality of TVC traffic and lack of public transport, it is estimated that 4.7 spaces per 100,000 enplanements is required.
 - 3) Short/Long-term parking %:TVC Parking Survey & Analysis by SBA, 2019





TVC Parking Survey and Analysis

Northwestern Regional Airport Commission & Cherry Capital Airport



Traverse City, MI
Cherry Capital Airport - TVC

JULY 2019



Submitted by:



STEVEN BALDWIN
ASSOCIATES

Airport Management Consultants





TVC Parking Survey & Analysis

Executive Summary

Steven Baldwin Associates (SBA) conducted a study to measure customer interest in covered parking at the Cherry Capital Airport (TVC) as part of the Airport’s strategic planning initiatives. The study was held for six weeks, (from May 1st to June 12th, 2019) using an online customer survey. During that time 955 customers participated in the online survey.

The results indicate that 55.75% of customers who parked at TVC are interested in covered parking, and 63.96% of those customers who are interested are willing to pay an increased fee for the use and convenience of covered parking at TVC. Therefore 35.66% of total customers who park at TVC would be likely to pay for covered parking if it were an option.

Using the price point elasticity of demand calculation from the gathered data, TVC would maximize its revenue from covered parking by charging a rate between \$12 and \$14 per day.

Interest for covered parking located within only the long-term lot was represented by 57.66% of survey respondents, this was followed by 29.20% for both the long-term and short-term lots, and 13.4% for just the short-term lot.

Preliminary calculations indicate that TVC could increase revenue approximately \$451,252 per year by instituting long-term covered parking.

Details of the parking study and the survey results can be found below.

Introduction & Background

As part of the Cherry Capital Airport’s ongoing-strategic planning initiative, Steven Baldwin Associates conducted a parking survey and analysis to measure customer interest in covered parking at TVC.

The primary goals of the study were to:

- 1. Measure the level of interest in covered parking,
- 2. Understand passengers’ willingness to pay an additional fee for covered parking, and
- 3. Gain feedback on where the covered parking should be located (short-term v. long-term lot).

Methodology

The study was performed using an online survey linked to the Airport WIFI. The survey was developed in coordination with Airport management to have multiple pathways to capture all types of TVC users. Survey pathways were triggered by customer responses to specific questions. The three main routes of the survey were 1) a person who parked a vehicle at the Airport (i.e., a driver), 2) a person who arrived within a vehicle that was parked at the Airport (i.e., a passenger), and 3) a person who arrived via a

vehicle driven by family or friends, taxi, TNC, or other means. In total, the survey contained 13 questions, and can be found in **Attachment 1**.

The survey was posted for a total of 43 days (six weeks) from May 1st to June 12th, 2019. During that time, a total of 955 customers took the survey at TVC. To ensure that the survey was taken by Airport users, only customers who were at the Airport and connected to the TVC WIFI were linked to the survey. The survey was additionally marketed by a banner within the Airport to direct customers to the WIFI for greater participation.

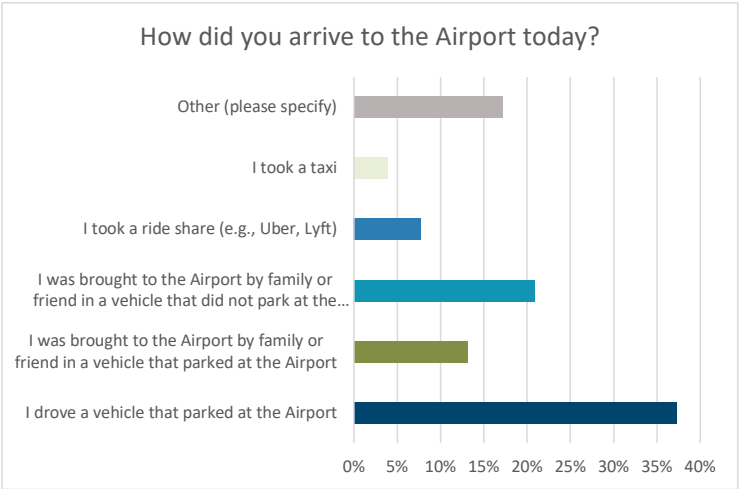
The results of the survey can be found below, separated into three sections: 1. Transportation, 2. Covered Parking, and 3. Characteristics of Customers.

1. Transportation

To understand how customers were arriving to the Airport, six different categories for transportation were provided to customers to select. The study found that 37.28% of customers drive and park at the Airport, and another 13.09% arrive within a vehicle that parks at the Airport. This results in approximately half of all customers using the parking facilities at TVC.

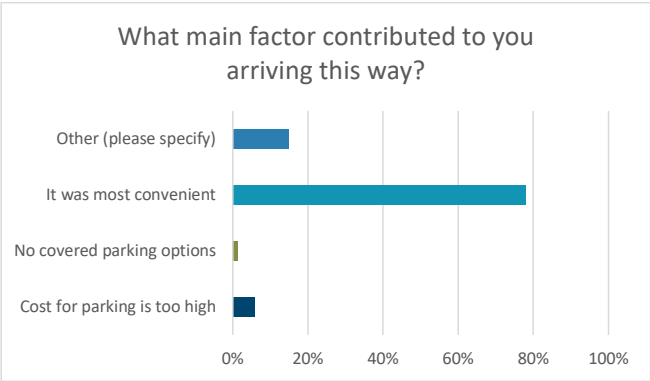
Further insights show that transportation network companies (Uber, Lyft, etc.) bring 7.75% of customers to the airport, which doubles that of local taxis at 3.87%. Many passengers also reported “other” to how they arrived at the Airport. Of the “other” answers, the majority were associated with the use of rental cars. Figure 1. below highlights the breakdown of how customers arrived at the Airport, and if they used the parking facilities.

Figure 1. Customer Arrival to the Airport



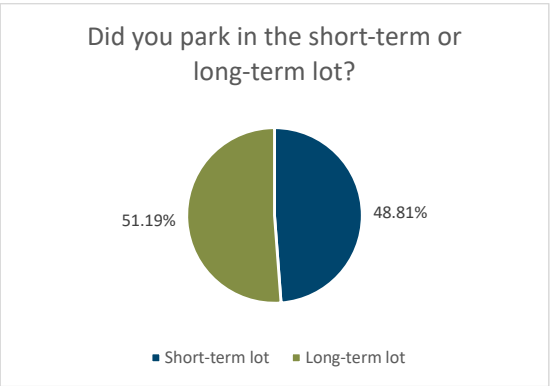
Using a follow-up question as to why customers selected to arrive and not park at the Airport, the survey indicate that the majority of customers selected their arrival method because it was most convenient. Only 1.39% of customers reported it was due to the lack of covered parking at the Airport. And only 5.79% reported it was due to the current parking costs being too high. See Figure 2. below.

Figure 2. Selection of Alternative Transportation



The customers who parked at the airport were directed to a follow-up question to identify what lot they parked in. As can be seen within the data in Figure 3., below, the selection of parking in short-term vs. long-term was split almost equally, with the long-term lot having a slightly higher percentage.

Figure 3. Parking Selection



Calculated from the answers received from those who parked at the Airport, the average number of passengers within the cars was 1.77 people, indicating that many customers using parking are traveling either alone, or within a small group out of TVC.

Within the parking survey, customers were asked for input regarding their duration of parking. That data was determined to be inconclusive due to the number of responses that provided answers that were “zero days” instead of listing the actual number of hours parked. Thus, to understand the average duration of parking by customers at TVC, SBA reviewed data collected by the Airport’s parking management company. This data indicates that the average duration of parking for the long-term lot is 4.84 days, and the average duration of parking for short-term is 0.71 days or 17.04 hours. Below Table 1. shows these numbers broken down by month.

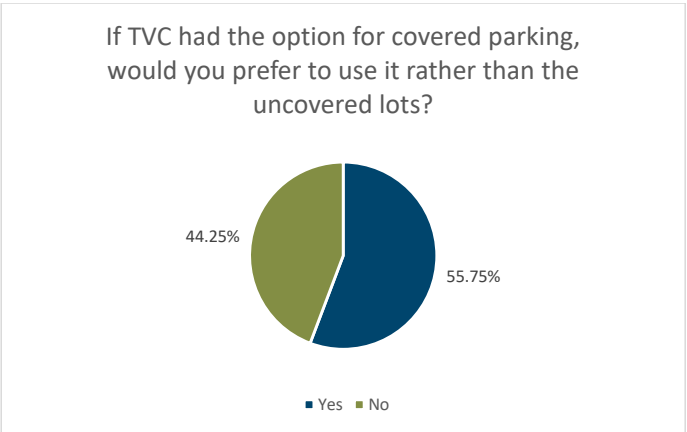
Table 1. 2018 Average Duration of Parking

2018 Average Duration of Parking		
Month	Long-Term Average Days	Short-Term Average Days
January	5.04	0.82
February	5.12	0.89
March	5.48	0.90
April	5.15	0.87
May	4.72	0.66
June	4.55	0.54
July	4.22	0.40
August	4.37	0.53
September	4.87	0.64
October	4.84	0.78
November	4.91	0.80
December	4.86	0.65
Total Average:	4.84	0.71

2. Covered Parking

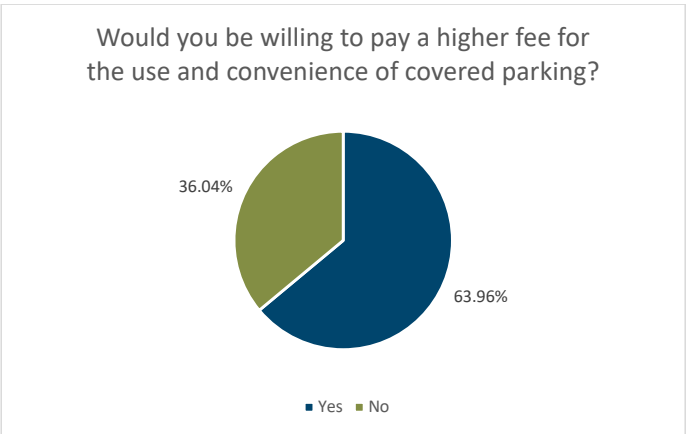
Customers who parked at TVC were asked if they would prefer to use covered parking over the uncovered lots. The results of the question indicate the level of interest customers have in covered parking if cost is not a factor. From this, data shows that 55.75% of all customers who parked at the Airport would prefer to use covered parking. Note, survey results were not affected by adverse weather conditions that are present during the winter months at TVC. See Figure 4. for the results to the survey question pertaining to customer preference for covered parking.

Figure 4. Customer Preference for Covered Parking



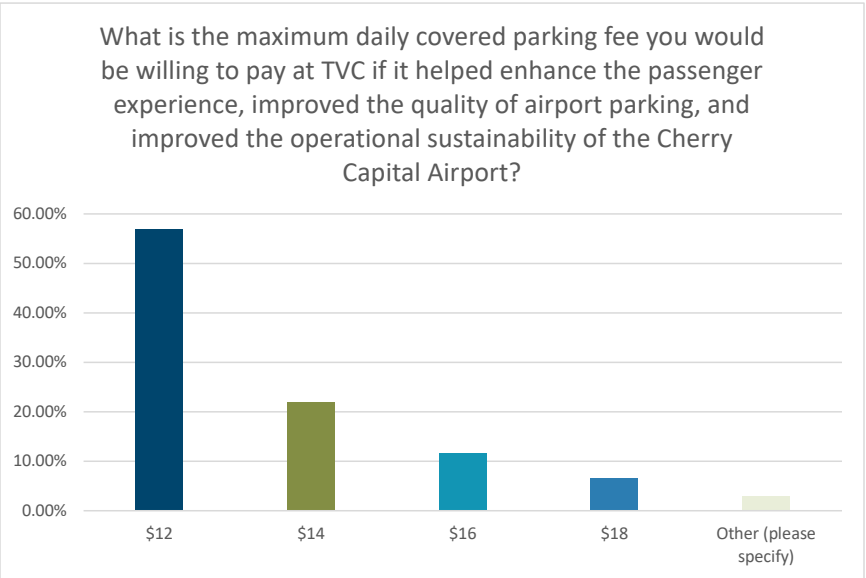
Of those who parked at the Airport and identified that they would prefer to use covered parking rather than the uncovered lots, 63.96% of customers said they would be willing to pay an increased rate. The 63.96% is an important distinction from the previous question as this percentage of customers now represent those who are willing to pay more than the current parking rates for the ability to park under covered parking. Obviously, it will take additional capital to build a structure to provide covered parking. By having additional revenue from customers who are willing to pay an increased rate, the Airport will more easily be able to recapture these capital expenses. Figure 5. below represents customers' willingness to pay an increased rate for covered parking.

Figure 5. Willingness to Pay



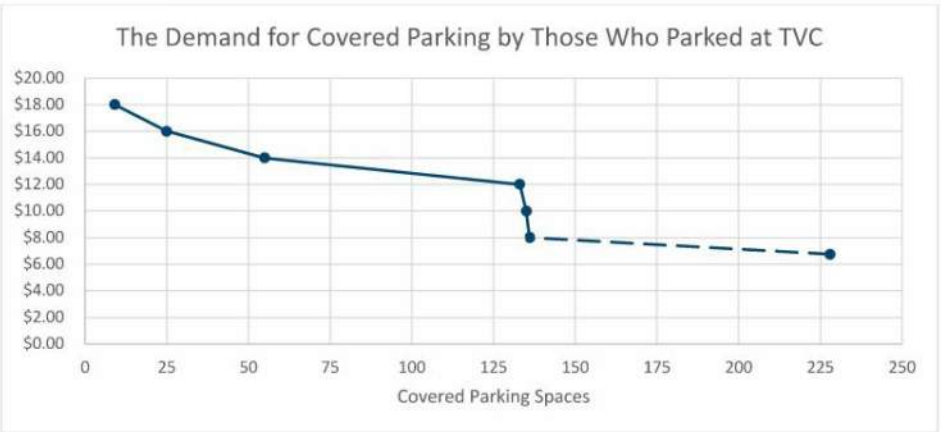
Additionally, the study reviewed the price point at which customers are willing to pay to use covered parking. The question gave five options for customers to respond, starting at \$12 per day up to \$18 per day, while also including an "other" option. The data received from this question indicates that the majority (56.93%) of customers would only like to pay a maximum of \$12 per day for covered parking. This is not surprising as many customers, especially those traveling for pleasure, are known to be price sensitive. Figure 6. below represents the maximum price points customers indicated for covered parking.

Figure 6. Maximum Daily Covered Parking Fee



The below demand schedule, within Figure 7. represents the demand for covered parking by those who park at TVC. This data indicates that as the price for covered parking increases, the quantity of covered spaces demanded decreases. We note that the below graph represents data also reported within the "other" category that was above the \$6.75 per day currently charged for uncovered long-term parking and subsequently produced the sharp drop in the graph.

Figure 7. Demand for Covered Parking



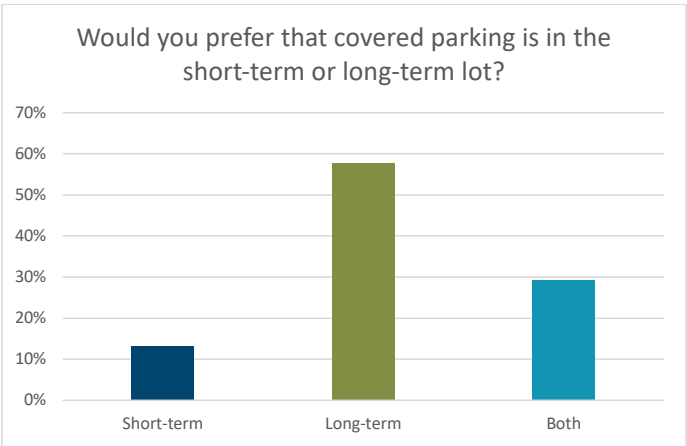
Further analysis of the data was performed using the point price elasticity of demand found in the right column of the demand schedule in Table 2. below. Point price elasticity is used to determine the optimal price that should be charged as a daily covered parking fee if it were determined that this is an option that Airport management wished to pursue and there was a desire to maximize parking revenue. The point at which the price elasticity of demand turns from elastic (the absolute value of the price elasticity is greater than one) to inelastic (the absolute value of the price elasticity is less than one) is the price at which parking revenues would be maximized. Using this rule, we know that the optimum price for covered parking falls between \$12 and \$14 per day.

Table 2. Demand Schedule for Covered Parking

Demand Schedule for Covered Parking		
Price	Quantity Demanded	Point Price Elasticity of Demand (Absolute Value)
\$6.75	228	
\$8	136	2.98
\$10	135	0.03
\$12	133	0.08
\$14	55	5.39
\$16	25	5.63
\$18	9	8.00

Location information for the covered parking was requested as well to assist Airport management with decision making on where to locate covered parking. The options were short-term, long-term, or both. The majority of customers indicated that they would like to see the covered parking be within the long-term lot; this was followed by customers who would like to have covered parking within both lots. See Figure 8. below for the customer preference for the location of covered parking.

Figure 8. Preference for the Location of Covered Parking



In consideration of the above data, SBA calculated preliminary estimates on the projected outcome if covered parking was constructed at TVC for long-term and short-term covered parking individually.

As the area that was most preferred by customers, SBA first looked at long-term covered parking. From SP+ collected data, the total long-term revenue of customers (customers who paid for parking) who park at TVC within a given year (2018 data) was calculated at 43,581 long-term parkers.

To calculate the projected number of customers that would use the covered parking, SBA used the percentages from two survey questions: the first was the percentage of people who would like to use covered parking rather than the uncovered lots (55.75%); the second was the percentage of people who desire covered parking and are willing to pay an increased rate (63.96%). The two percentages therefore amount to 35.66% of all customers, or approximately 15,539 long-term customers per year who would use long-term covered parking.

The price point elasticity of demand calculations indicated the price for covered parking should fall between \$12 and \$14 dollars per day. Seeing that the price point elasticity is equal to 1 nearest to \$12 per day, we selected \$12.75 as the optimum price per day for covered parking.

Factoring the average duration of long-term parking at 4.84 days into the calculation, the results show that the projected annual revenue from long-term covered parking is approximately \$958,911 per year. Considering the price of current uncovered long-term parking at \$6.75 per day, the overall increase in revenue was calculated to be approximately \$451,252 per year. For details, see Table 3. below.

Table 3. Annual Long-Term Covered Parking Revenue Projection

Annual Long-Term Covered Parking Revenue Projection	
Annual Long-Term Parkers*	43,581
Percentage of Total Customers who Want Covered Parking and are Willing to Pay an Increased Rate	35.66%
Projected Number of Customers Willing to Pay for Long-Term Covered Parking Annually	15,539
Average Days Parked per Customer (Long-Term)	4.84
Assumed Daily Covered Parking Price	\$12.75
Projected Annual Long-Term Covered Parking Revenue	\$958,911.69
Current Daily Uncovered Long-Term Parking Price	\$6.75
Uncovered Parking Revenue No Longer Received	\$507,659
Projected Increase in Annual Revenue from Long-Term Covered Parking	\$451,252.69

*Derived from SP+ data on long-term revenue parkers at TVC

If we use the short-term projection, as can be found within Table 4. below, we can see that the projected increase in annual revenue is significantly smaller at only \$41,305 annually. This is primarily due to the fact that the current price of short-term uncovered parking is set at \$10 per day representing a smaller difference in the assumed price of covered parking set at \$12.75 per day.

Table 4. Annual Short-Term Covered Parking Revenue Projection

Annual Short-Term Covered Parking Revenue Projection	
Annual Short-Term Parkers*	59,330
Percentage of Total Customers who Want Covered Parking and are Willing to Pay an Increased Rate	35.66%
Projected Number of Customers Willing to Pay for Short-Term Covered Parking Annually	21,155
Average Days Parked per Customer (Short-Term)	0.71
Assumed Daily Covered Parking Price	\$12.75
Projected Annual Short-Term Covered Parking Revenue	\$191,505.64
Current Daily Uncovered Short-Term Parking Price	\$10.00
Uncovered Parking Revenue No Longer Received	\$150,200.5
Projected Increase in Annual Revenue from Short-Term Covered Parking	\$41,305.14

*Derived from SP+ data on long-term revenue parkers at TVC

Not considering where the location of covered parking would be located, and if both short-term and long-term customers were to select and use covered parking at \$12.75 per day, the airport would gain approximately \$492,557 per year in revenue.

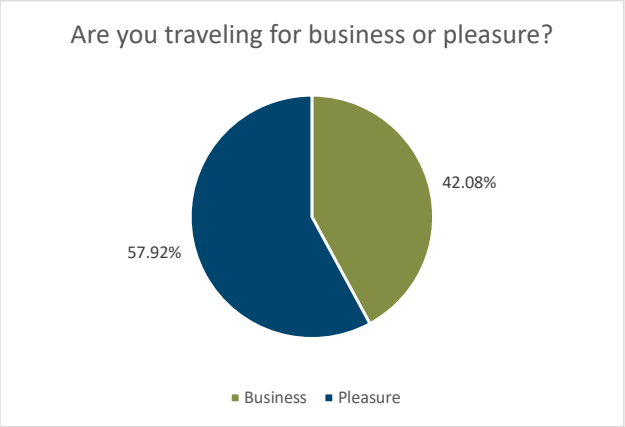
The cost for construction of covered parking along with the increase in annual revenue gained should be considered when determining if covered parking is a viable option for TVC.

Note, the above revenue projections are only preliminary estimates based off of the data from the survey and assumptions made during the analysis.

3. Characteristics of Customers

In addition to specific questions related to parking, the survey was designed to capture general information about the customers as well. The information collected included a customer’s purpose of travel for business or pleasure, where they are from, and their level of satisfaction with the Airport. The first question regarding purpose of travel can be seen below in Figure 9.

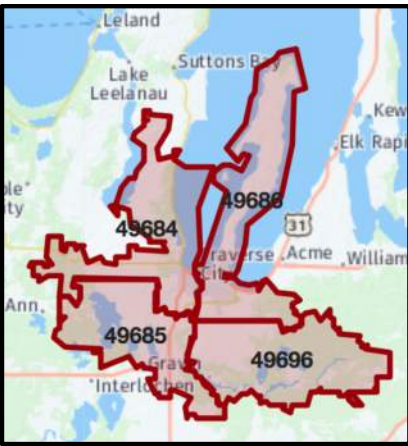
Figure 9. Purpose of Travel



Based on the collected data, TVC experienced a higher number of pleasure travelers (approx. 58%) compared to business travelers during the duration of the study (approx. 42%). This trend follows and confirms the information previously gathered by Airport management about the TVC market.

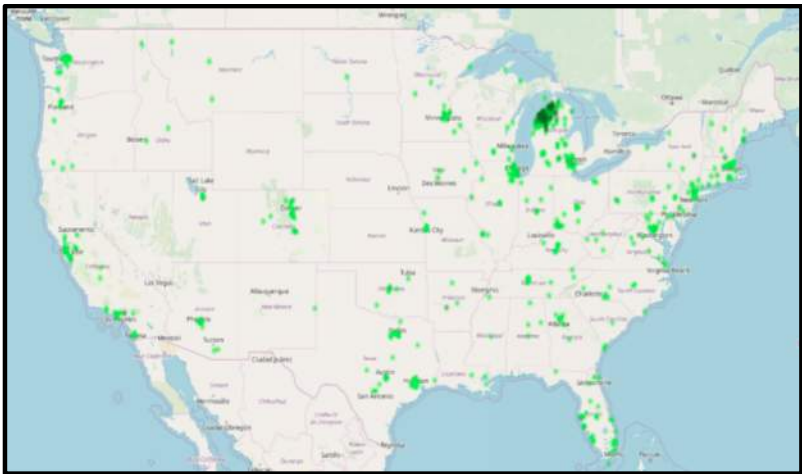
The survey additionally asked customers to provide their zip code. The majority of customers represented within the study were from zip code 49686, which TVC falls within. This was followed by zip codes 49684 and 49685, which represent the areas directly surrounding TVC, as shown in Figure 10. below.

Figure 10. Traverse City Regional Zip Codes



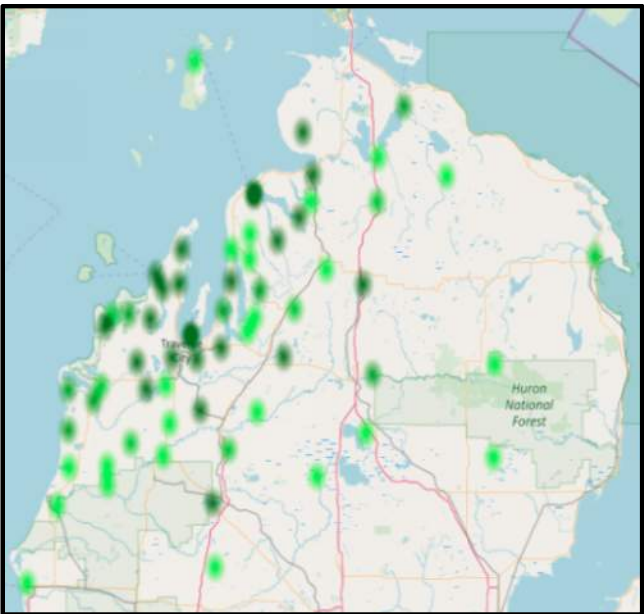
A depiction of all the zip codes received within the Contiguous United States can be found within the heat map in Figure 11. The dark green represents areas of large amounts of reported zip codes from customers traveling through TVC. The light green represents other zip codes of travelers.

Figure 11. Heat Map of Contiguous United States



A further look at the Traverse City Regional Area can be found within Figure 12. which confirms a strong number of customers who are from the area immediately surrounding the TVC Airport as well as other areas that are using the Airport from within Michigan's lower peninsula.

Figure 12. Heat Map of Traverse City Regional Area



Customer satisfaction at the Airport was rated on a scale from Excellent to Poor. Of the customers who answered this question, 52.34% of them reported the highest rating of Excellent, 28.52% as Very Good, 15.76% as Good, 1.95% as Fair, and the remaining 1.43% as Poor. A pie chart of the scores can be seen within Figure 13.

Figure 13. Customer Satisfaction



A conversion of the above scale to numbers, Excellent represented as 5, and Poor as 1, we find that the average customer satisfaction rating equals 4.28. TVC can therefore be said to have a Very Good to Excellent customer satisfaction rating.

4. Conclusion

Parking can be viewed as an important aspect of TVC strategic planning, given it’s relationship to significant operating revenue, and covered parking in particular can be seen as a potentially important strategic initiative to undertake.

The parking survey indicated that approximately 56% of all customers who park at TVC would be interested in having a covered parking option. Of those, approximately 64% would be willing to pay additional fees.

The optimal price point for the cost of covered parking, if offered, was between \$12 and \$14. Using \$12.75 as the optimal price point, additional revenue from between \$451,253 - \$492,558 could reasonably be expected on an annual basis at current passenger levels.

Attachment 1. Survey Questions



TVC Customer Survey

On behalf of the Northwestern Regional Airport Commission, I would like to thank you for flying with the Cherry Capital Airport (TVC). We are asking our passengers to please take a few minutes to answer the short series of questions below regarding your experience at the Airport, particularly regarding transportation and parking. Your input is greatly appreciated and will be used for measuring the community's interest in potential airport initiatives, such as covered parking which has garnered a lot of interest. As the Airport operates completely on user fees (without any local tax subsidies), we would like to gauge whether there is customer support for these types of strategic investments in our infrastructure.

Thank you for your input.

Sincerely,
Kevin Klein, Airport Director

1. Are you traveling for business or pleasure?

☐ Business

☐ Pleasure

* 2. What is the zip code of your primary residence?

* 3. How did you arrive to the Airport today?

☐ I drove a vehicle that parked at the Airport

☐ I took a ride share (e.g., Uber, Lyft)

☐ I was brought to the Airport by family or friend in a vehicle that *parked* at the Airport

☐ I took a taxi

☐ I was brought to the Airport by family or friend in a vehicle that *did not park* at the Airport

☐ Other (please specify)

1



TVC Customer Survey

4. How many people were in the vehicle including yourself?

5. Did you park in the short-term or long-term lot?

☐ Short-term lot

☐ Long-term lot

6. Total duration of parking? (Days)

* 7. If TVC had the option for covered parking, would you prefer to use it rather than the uncovered lots?

☐ Yes

☐ No

2



TVC Customer Survey

We'd like to measure your interest in covered parking. We can only make it possible through additional parking fees. Knowing that covered parking will take a large capital investment and is a privilege above current options, please answer the following:

* 8. Would you be willing to pay a higher fee for the use and convenience of covered parking?

☐ Yes

☐ No

3



TVC Customer Survey

* 9. What is the **maximum daily covered parking fee** you would be willing to pay at TVC if it helped enhance the passenger experience, improved the quality of airport parking, and improved the operational sustainability of the Cherry Capital Airport?

☐ \$12

☐ \$14

☐ \$16

☐ \$18

☐ Other (please specify)

* 10. Would you prefer that covered parking is in the short-term or long-term lot?

☐ Short-term

☐ Long-term

☐ Both

4



TVC Customer Survey

* 11. What main factor contributed to you arriving this way?

☐ Cost for parking is too high

☐ No covered parking options

☐ It was most convenient

☐ Other (please specify)

5



TVC Customer Survey

12. How would you rate your overall experience at the Airport?

☐ Excellent

☐ Fair

☐ Very Good

☐ Poor

☐ Good

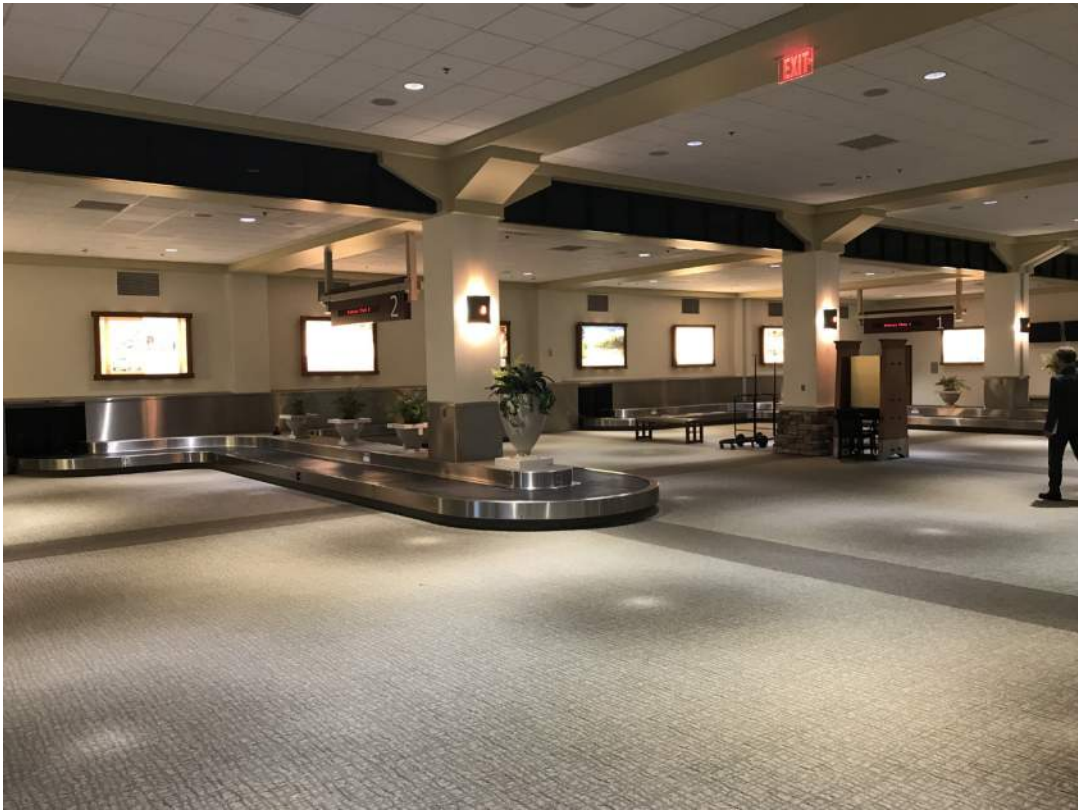
13. Please feel free to offer comments regarding your answer to the previous question.

6

APPENDIX

O: PHOTO INVENTORY OF EXISTING CONDITIONS

The photos of the existing TVC facilities on the following pages were taken in October 2019.



APPENDIX



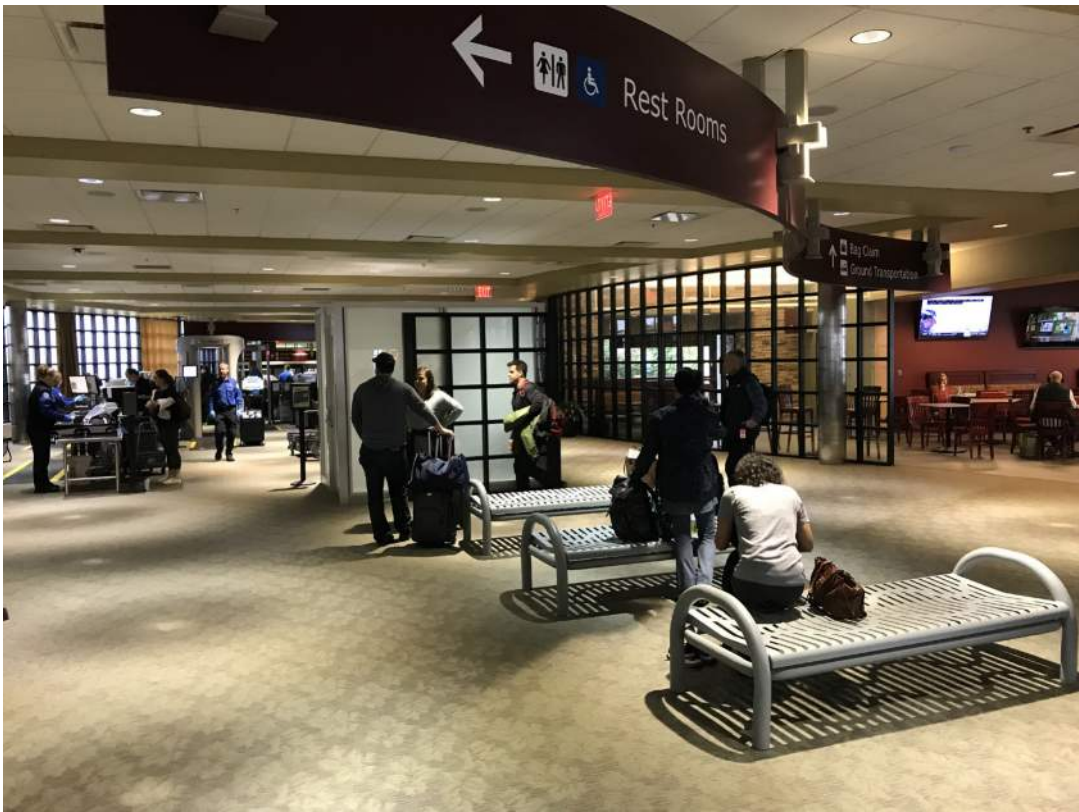
APPENDIX



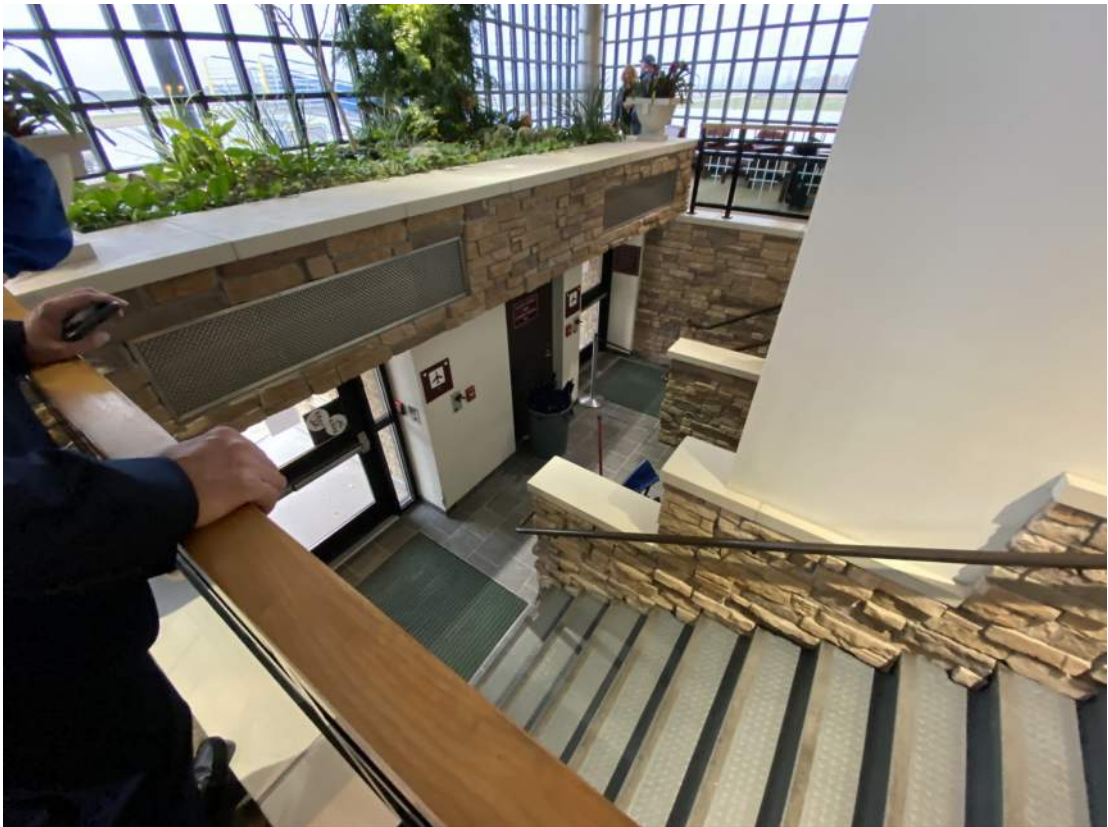
APPENDIX



APPENDIX



APPENDIX



APPENDIX



ALLIANCE

in association with

Prein&Newhof

Alliance

400 Clifton Avenue
Minneapolis, MN 55403
612.874.4100
www.alliance.us

Prein&Newhof

990 Garfield Woods Dr, Suite A
Traverse City, MI 49686
231.946.2394
www.preinnewhof.com